

# AGAINST OUR NATURE

A HITCHHIKER'S GUIDE TO THE CLIMATE CRISIS

JAMES WHITEMAN  
STEVE WAYGOOD  
MARTIN CASSIDY



*“ I urge you to read ‘Against Our Nature’ as a passionate and visually striking summary of the – unarguable – science of climate change, as a warning about what will happen if, collectively, we don’t act, but also for its optimistic message. The authors work for a business that is one of an increasing number shifting towards a more sustainable operating model, and they provide us with evidence that that is part of a wider trend, and that we can realise a different future for both people and planet. And they are right that – while we need our leaders in both government and business to do far more; so do keep lobbying them! – it’s also for each of us to make changes in our own lives; to how we invest our money, how and where we travel, the energy we use and the food we eat. We all have the power to change the world.”*

**– TANYA STEELE, CHIEF EXECUTIVE – WWF-UK**

*“ If climate change and the steps we need to take to combat its worst effects seem bewildering and beyond reach... please read this book. We CAN all play our part.”*

**– DR RHIAN-MARI THOMAS OBE, CHIEF EXECUTIVE – GREEN FINANCE INSTITUTE**

*“ This book takes a fresh approach to how we will succeed in the face of the climate crisis. It looks at what makes us tick as human beings and how we cease to see climate action as a tough uphill battle but rather as a downhill race where we get faster the further we run.”*

**– NICK ROBINS, PROFESSOR IN PRACTICE – SUSTAINABLE FINANCE**

*“ Addressing the challenges of the climate crisis requires us all – consumers, businesses, investors, policymakers, central bankers – to act. This fabulous book sets out why and how each one of us can turn individual aspiration into action. And alongside the Bank of England’s work to ‘green finance’, I am optimistic that together we can help deliver the collective change that is needed, now.”*

**– SARAH BREEDEN, EXECUTIVE DIRECTOR, FINANCIAL STABILITY STRATEGY AND RISK  
AND EXECUTIVE SPONSOR, CLIMATE CHANGE – BANK OF ENGLAND**

**To the planet, and all  
those looking out for it.**

**Don’t panic**

October 2021

“Human beings, who are almost unique in having the ability to learn from the experience of others, are also remarkable for their apparent disinclination to do so.”

— Douglas Adams, *The Hitchhiker’s Guide to the Galaxy*

# FOREWORD

This a very unusual book – and I hope it’s okay if I write a slightly unusual foreword to it.

First – the book itself. Let’s get that out of the way. It’s brilliant. You should read it right to the end. You don’t have to read it all at once. You don’t actually even have to read it in the right order. But it will definitely change your usefulness as a human. It’ll definitely help the planet. And it’ll definitely entertain you. It’s win / win / win. If you’re short of time, you can now skip the rest of this foreword and just get down to the wonderful contents of the book itself. And enjoy the dreamy fact that half of it isn’t writing at all – it’s nice big illustrations and quotes. If only Tolstoy and Dickens had done that, I might have actually read *War and Peace* and *Bleak House*.

Second – I thought I’d just tell you a couple of stories about Douglas Adams. The “Hitchhiker’s” word in the title is a tribute to him, there’s a quote by him at the start of every chapter, and he was a very good friend of mine. He was also very nice and cared hugely about the state of the planet. He travelled the world looking for species that were dying out and wrote a book called *Last Chance to See*. He’d be horrified at the way species loss has continued, horrified that, just as in *Hitchhiker’s Guide to the Galaxy*, the world might be about to be destroyed, and even more horrified that the people doing the destroying aren’t Vogons – it’s we humans ourselves.

I first met Douglas at lunch in Los Angeles; he was a friend of friends of mine, and I was having a hard time working on my very first film and was in despair. The lunch went well – and at the end he asked me back home for a drink. After the drink he asked me to stay the night. I stayed for six weeks. I told you he was nice – and perhaps the moral of the story is that all of us can change someone else’s life. He saved me – and you can help save the planet.

The next story is from right at the end of our friendship. We were having lunch at Pizza Express in Islington and, suddenly, Douglas

paused, which was unusual for him. He liked to talk. He took a deep breath, and said, “Richard, I think I’ve discovered the meaning of life – and it’s not 42.” “Sorry?” I said. “Yes – he replied – “I’ve been thinking about it long and hard and I think I’ve at last found a way to reconcile the scientific view of life with the religious and moral one; found the common ground between Chaos Theory & The New Testament.” Now, the problem is, I’d had a hard week, and this sounded like a pretty heavy conversation. So, instead of pressing him, I said, “How’s Jane?” and he forgot about the meaning of life and told me a funny story about his wife Jane. And not long after, Douglas went and died. Ever since then, I’ve been tortured by the thought that I had the unique chance to hear and then communicate the solution to the greatest of human mysteries and to all the problems of the world. And maybe Douglas never told anyone else – and I missed it.

How does that relate to this book? Well, only just – but maybe a bit. Human civilisation is at a total crossroads – it’s Code Red For Humanity. Don’t make the same mistake I did. Don’t ask “How’s Jane?” and dive into your American Hot Pizza. Read this book instead and save the planet.

I’m especially obsessed as an individual about the power of shifting your pension to make it sustainable and planet-saving without losing any actual money (check it out on page 117!). Such an easy thing to do – so much money moved into making a difference. But that just shows what a brilliant and broad subject this is and how we can all play our part in so many ways. If you find a few things in here that ring loud bells with you, then just do them and your time spent reading the book will be some of the best time you’ve ever spent.

**Don’t panic** – just read on...

*Richard Curtis, writer, film director  
and co-founder of Make My Money Matter*



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# INTRODUCTION



“Did I do anything wrong today, or has the world always been like this and I’ve been too wrapped up in myself to notice?”

— Douglas Adams, *The Hitchhiker’s Guide to the Galaxy*

## AN UPHILL BATTLE

There are three types of people in this world: perfect carbon citizens; climate change deniers; and the rest of us. This book is for the latter; for anyone who cares about the planet and wants to better understand the role (however large or small) they can play in helping to avert a climate disaster.

For all the complexity surrounding climate change, the webs of relationships, the multiple causes, effects and unintended consequences, there is one variable that remains frustratingly hard to pin down: ourselves.

That we have entered the Anthropocene – an epoch defined by the simple fact that humans are the dominant influence on the climate and environment – is well understood and accepted. But getting close to understanding the intrinsic motivations of individuals that aggregate up to billions of decisions is a daunting prospect. It is a curious irony that we understand more about what is happening in galaxies light years away than we do about what is going on between our ears.

Thankfully, we don’t need to delve too far into the medical detail of neuroscience to obtain useful insights into the psychology of climate change. Anyone who has ever experienced the disconcerting sensation of walking down a broken escalator intuitively understands how ingrained some of our mental shortcuts really are. These heuristics can be incredibly useful, not to mention time saving: like bineg albe to raed tihs snetnece. But they can also cause huge problems. Unfortunately, our behaviours repeatedly undermine our beliefs.

By identifying the behaviours we can fix easily, acknowledging those areas where we might need helpful ‘nudges’, and

permitting selective prescriptive policies, we can collectively find a way through the climate fog. We will find that when we do, the scary tipping points and non-linear effects that could so easily blow us off course can equally be used to our advantage. The role of cultural and social norms as a regulating force for good should also become clear – as will the latent power of our savings and investments.

Our aim is to tug at a tension between what it means to be human and what it means to err. And just like the mythical Sisyphus – the king of Corinth who was sentenced to an eternal punishment of rolling a boulder up a hill, only for it to continually roll back down again – coping with climate change can feel like an overwhelming challenge. However, armed with better self-knowledge we do have reason to be hopeful.

By blending expertise in climate change finance, communications and design, we have attempted to serve up this wonderfully personal and complex story in bitesize and beautiful idea chunks. For while climate change rightly demands our attention, there is no need for it to feel like a chore. Any playfulness contained in here is therefore merely meant to make the subject more engaging, not any less important.

Above all, *Against Our Nature* is meant to get you thinking, to recognise the kinks in your perception and to encourage you to take ownership of your own role in the climate fight. You don’t have to agree with everything we put forward for it to be of value. The book is simply a microcosm for the inherent contradictions that spawn from the daily struggle of fighting with our most innate feelings, emotions and motivations.

Enjoy.

02

*THE  
EVIDENCE*



“We demand rigidly defined areas  
of doubt and uncertainty!”

— Douglas Adams, *The Hitchhiker’s Guide to the Galaxy*

# IT IS ALREADY HAPPENING AND WE ARE CERTAIN

There is enough evidence out there already to render this chapter utterly pointless. We apologise in advance for including it. Please feel free to skip straight to *Humans behaving badly*, as many readers will find nothing new in here. (Though perhaps pause on the last two charts.)

Our continued addiction to fossil fuels is causing global temperatures to rise, ice caps to melt, large-scale biodiversity loss and extreme weather events to become more frequent.

But are our actions to blame? The answer from science is a resounding yes.

The Sixth Assessment Report of the Intergovernmental Panel on Climate Change released in August 2021 states: “Observed increases in well-mixed greenhouse gas (GHG) concentrations since around 1750 are unequivocally caused by human activities.” And it goes on to say: “The likely range of total human-caused global surface temperature increase from 1850–1900 to 2010–2019 is 0.8°C to 1.3°C, with a best estimate of 1.07°C.”

In simple terms, the scientific community overwhelmingly believes humans are at least partly responsible.

This scientific understanding is nothing new, either. In 1824, Jean-Baptiste Joseph Fourier identified the greenhouse effect. In 1896, Svante Arrhenius, a Swedish meteorologist, first calculated the effect of increased carbon dioxide on global temperatures. His estimates from over a century ago now look eerily prescient: he suggested that a doubling in CO<sub>2</sub> would lead to an increase in global temperatures of five to six degrees Celsius, smack bang in the middle of the IPCC estimate range and well beyond the upper limit of two degrees above pre-industrial levels the Paris Agreement calls for.

Many other warning signs have come and gone too. Most notably, senior NASA scientist James Hansen’s speech to US Congress more than 40 years ago in 1988, where he warned about “*human activities disrupting the climate*”. But it is Kim Nicholas, a sustainability scientist, who has arguably summed up the situation better than anybody we have come across:

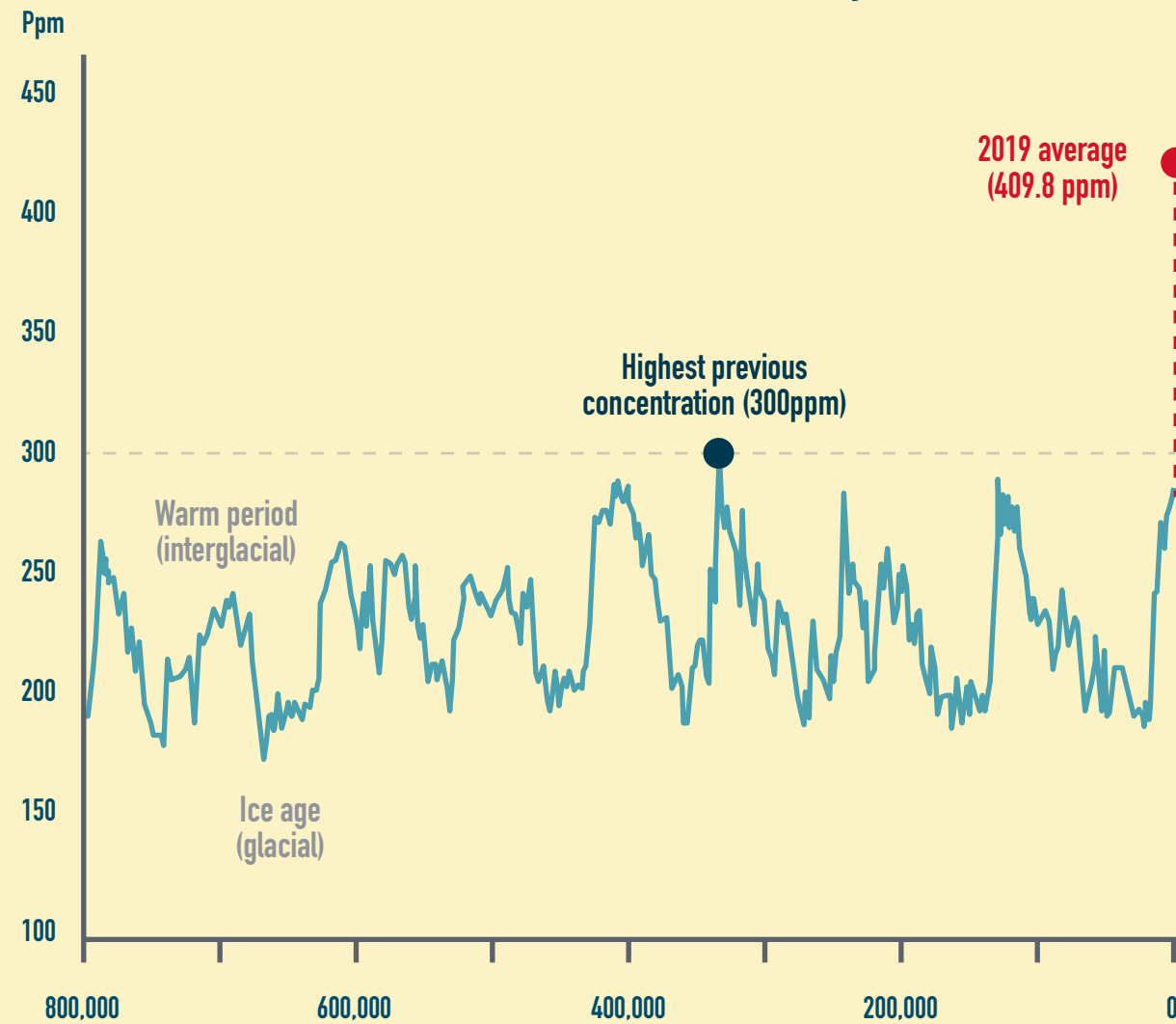
1. It’s warming
2. It’s us
3. We’re sure
4. It’s bad
5. We can fix it

These bullet points make up a sign she has used on climate marches. Her points are deceptively simple but cut to the heart of the problem. The overriding point Nicholas makes is that we know enough to act.

The rest of this chapter should help reinforce bullet points one, three and four.

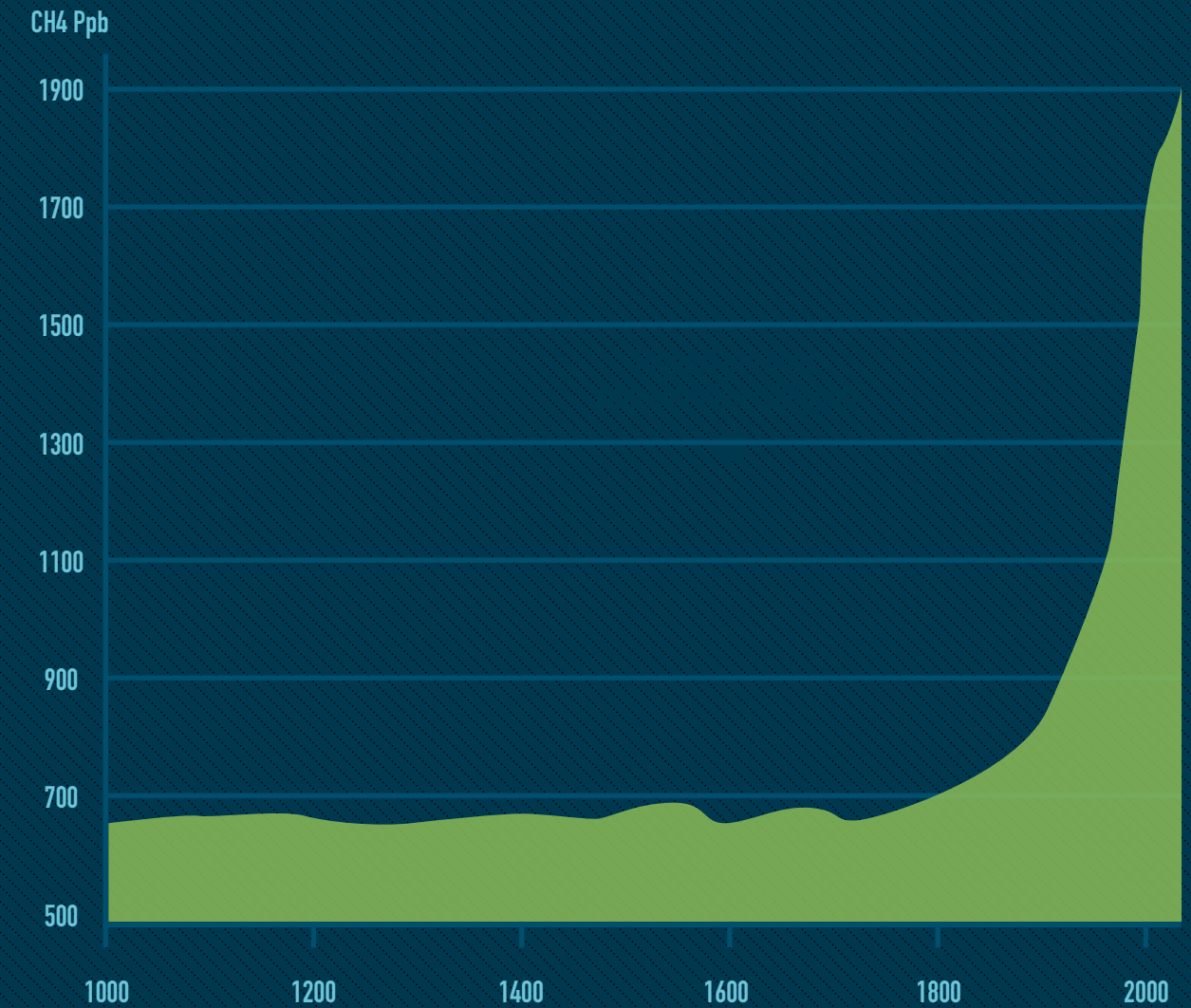
But most of us know all these facts already, at least on some level. Unfortunately, facts – and dire ones in particular – seem to cause a numbing paralysis. Simply throwing more and more evidence at people seems to do little to change their minds or behaviour. That is why the rest of the book is dedicated to bullet points two and five – and understanding how we can hack our own psychology to correct course. Creating a better alignment between our beliefs and behaviours will go a long way towards solving things.

## Carbon dioxide over 800,000 years



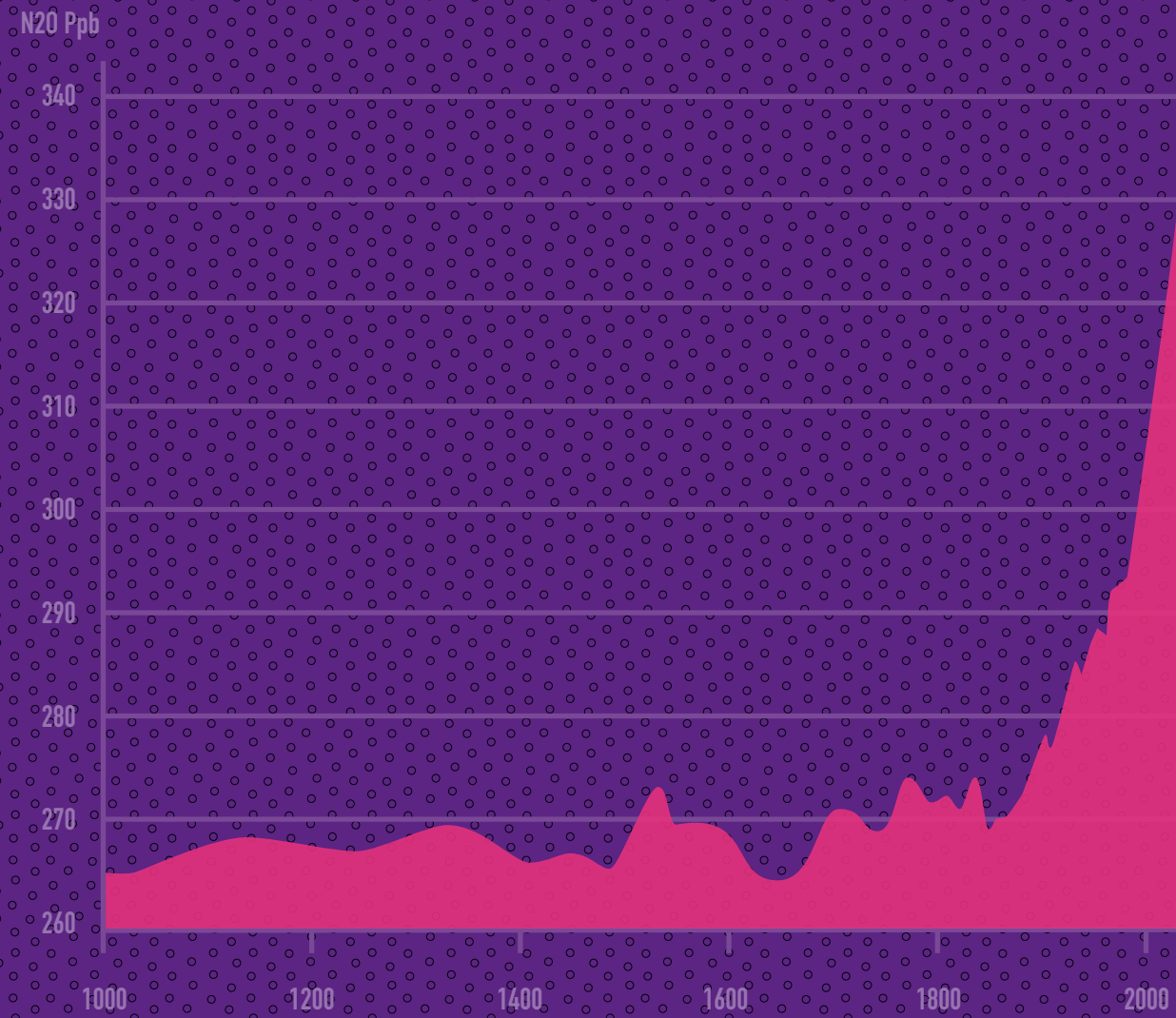
Note: This graph, based on the comparison of atmospheric samples contained in ice cores and more recent direct measurements, provides evidence that atmospheric CO<sub>2</sub> has increased since the Industrial Revolution. Source: Luthi, D., et al. 2008; Etheridge, D.M., et al. 2010; Vostok ice core data/J.R. Petit et al.; NOAA Mauna Loa CO<sub>2</sub> record.

## Global methane levels



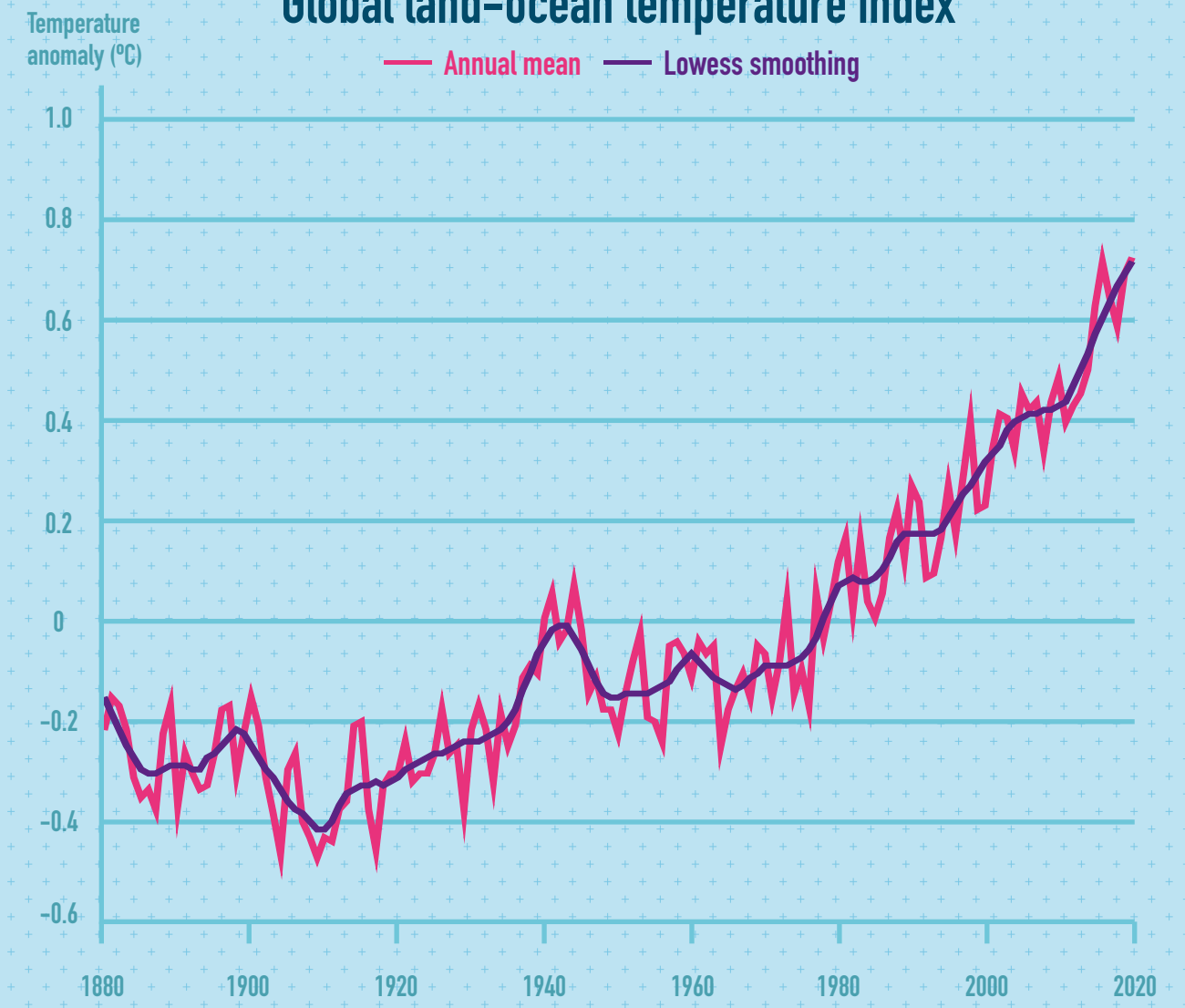
Source: [www.climatelevels.org](http://www.climatelevels.org), August 2021

## Global nitrous oxide levels



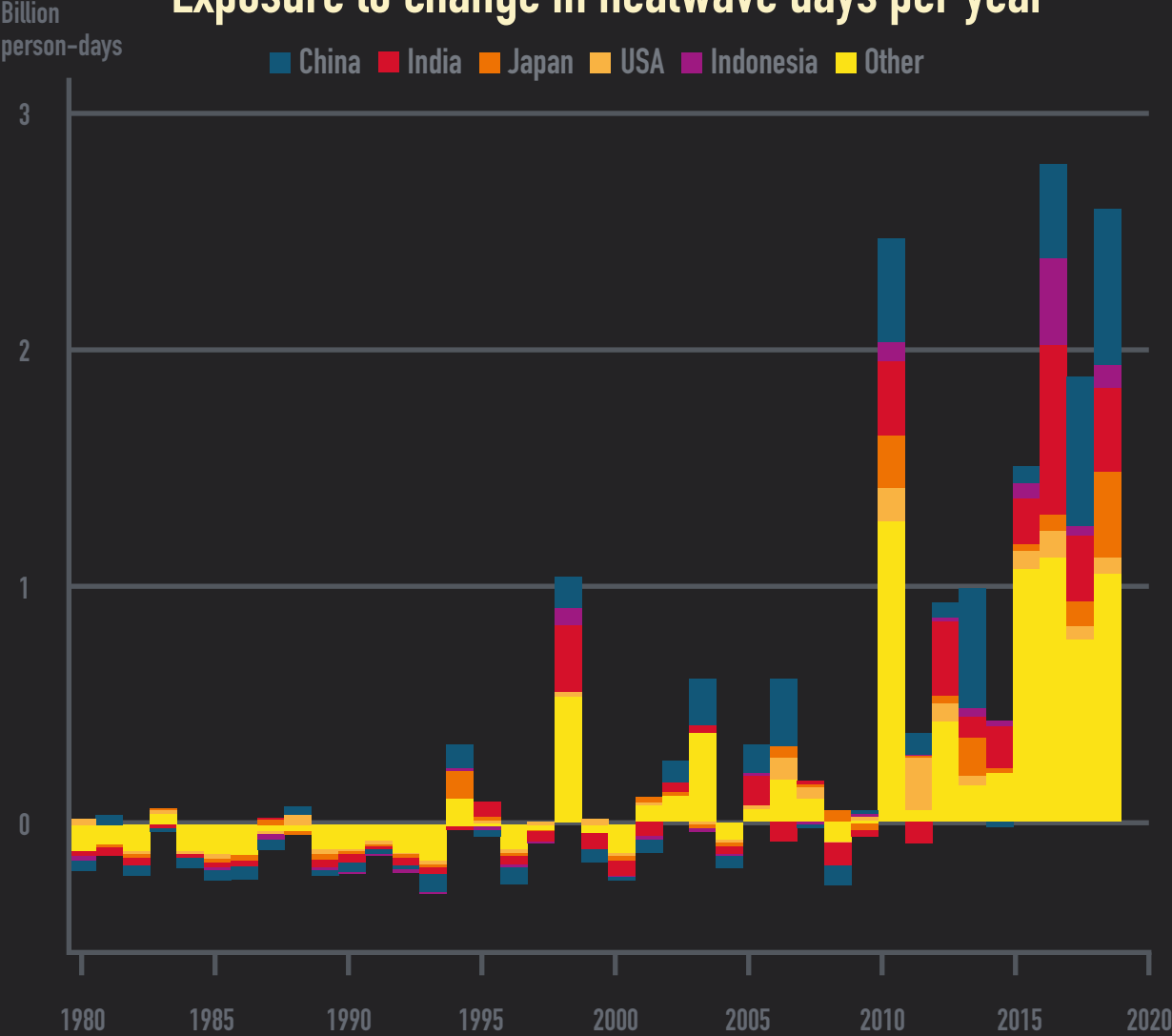
Source: [www.climatelevels.org](http://www.climatelevels.org), August 2021

## Global land-ocean temperature index



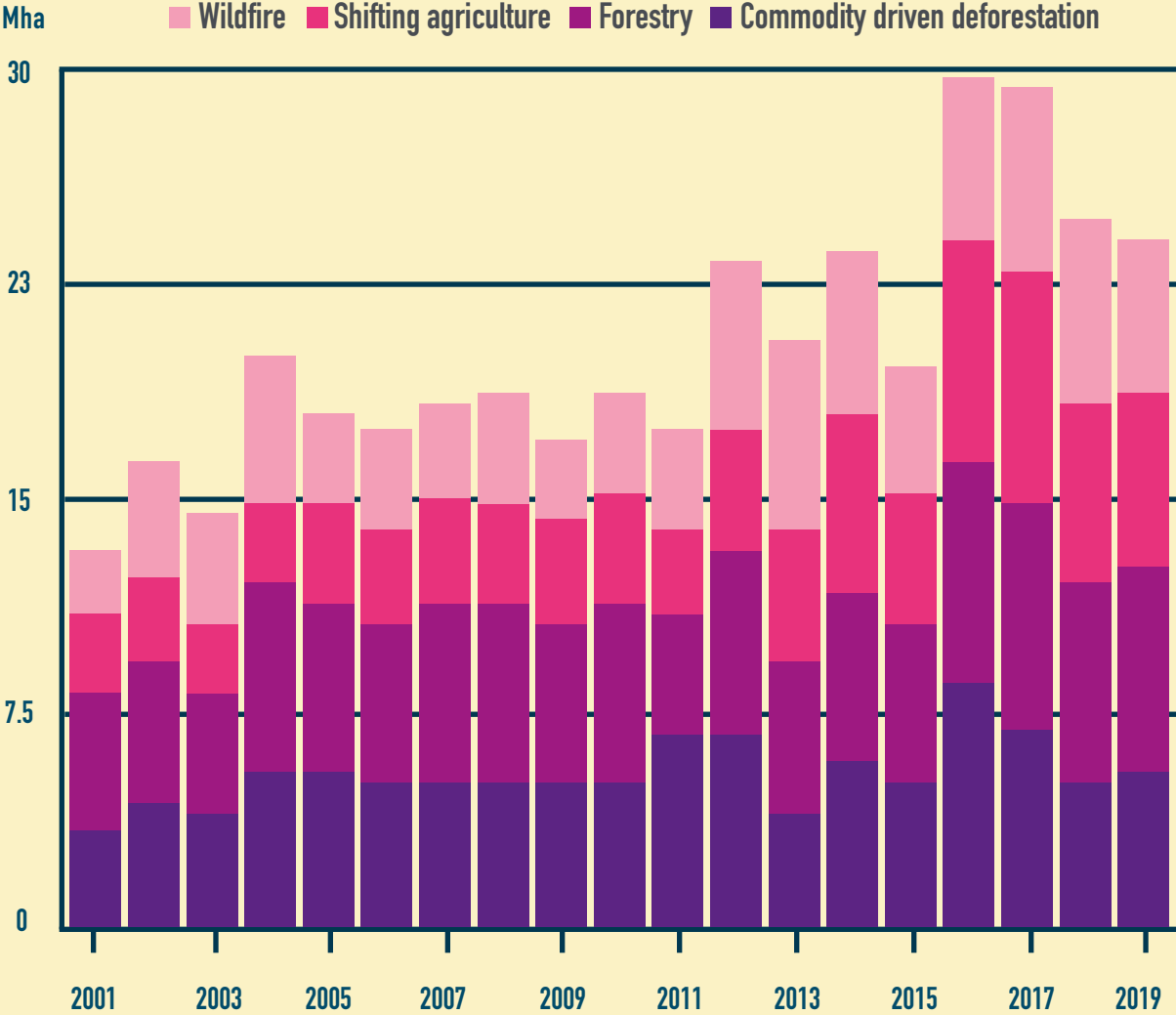
Source: NASA's Goddard Institute for Space Studies (GISS), August 2021

# Exposure to change in heatwave days per year



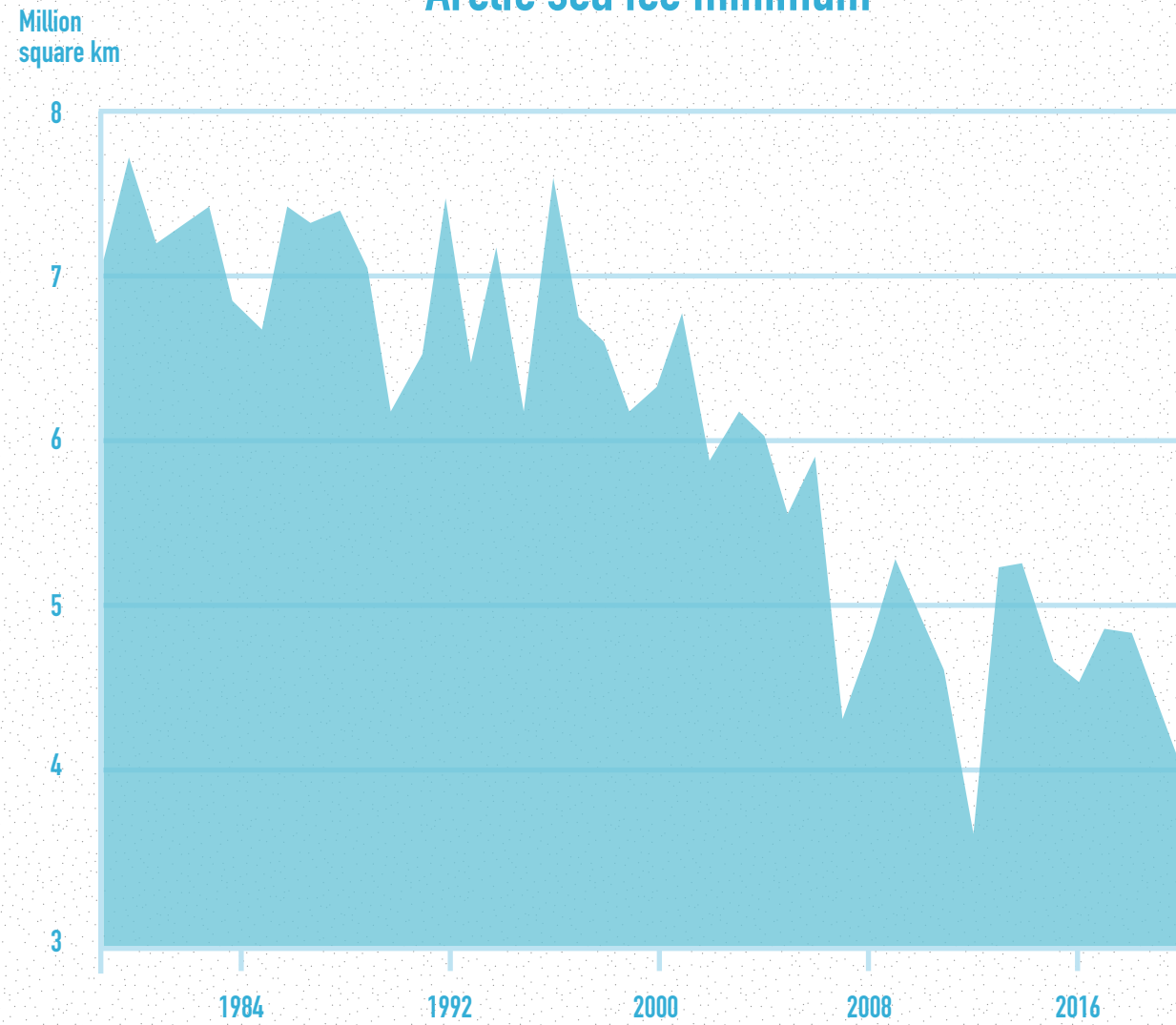
Source: Global and cross-country analysis of exposure of vulnerable populations to heatwaves from 1980 to 2018, Dr Jonathan Chambers, Institute for Environmental Sciences, UNIGE

# Global annual tree cover loss by dominant driver



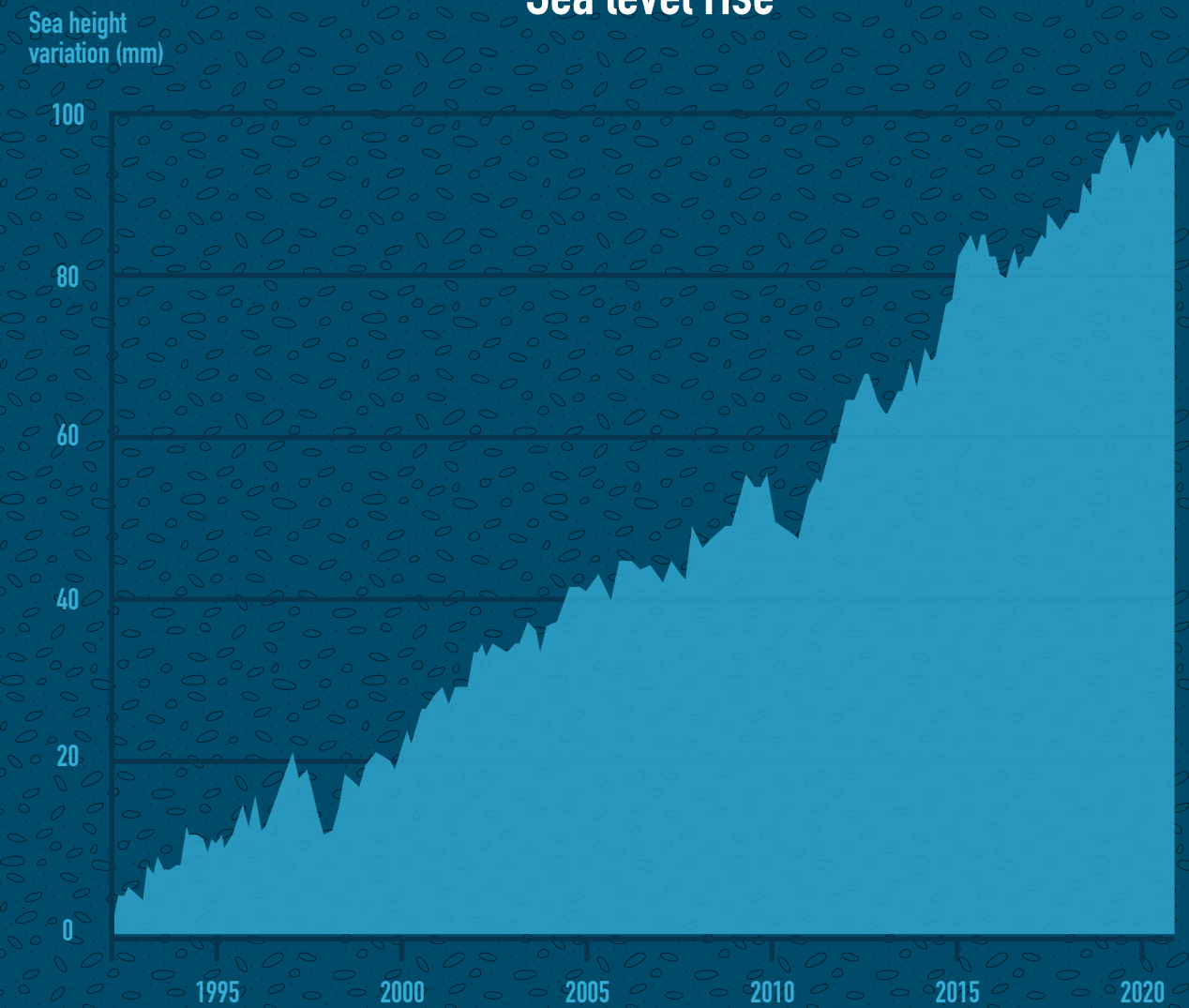
Source: The Sustainability Consortium, World Resources Institute, and University of Maryland, 'Tree Cover Loss by Driver.' Accessed through Global Forest Watch in August 2021

## Arctic sea ice minimum



Source: Satellite observations, NSIDC/NASA. August 2021

## Sea level rise



Source: Satellite sea level observations, NASA's Goddard Space Flight Center. August 2021



There is a legendary old Irish joke that tells of a haplessly lost tourist who asks an old man by the side of the road for directions to Dublin. After a few minutes deliberating, the man replies, "Well, if I were you, I wouldn't start from here".

While the joke's origins are contested, it perfectly sums up where we are with climate change. Yet here we are; we have collectively dealt ourselves a crappy hand and we must find ways of getting to our net-zero equivalent of Dublin.

We cannot and should not be paralysed by the uncertainty that surrounds the situation. We are certain enough to know that action needs to be taken, and taken quickly. We can't afford to wait for the perfect amount of information, the perfect plan, or perfect solutions.

The future is always uncertain and we need to embrace the ambiguity that comes from not knowing exactly what lies ahead. Scientific and economic models will only tell us so much, to within a certain degree of confidence. The rest is up to us. We need the creativity to peek through our climate's horizon and to imagine what is lurking around the corner; more importantly, to understand that we can influence what we will find there — if we change things up, quickly.

As Paul Polman, former CEO of Unilever and Co-Founder and Chair of IMAGINE puts it: "The cost of inaction already significantly exceeds the cost of action."

The last two charts in this chapter show what he means in vivid graphical form. What follows will hopefully help us all play our collective hand better.

**“THE COST OF  
INACTION ALREADY  
SIGNIFICANTLY  
EXCEEDS THE  
COST OF ACTION”**

## Carbon budget

To align with 1.5°C warming objective

### Remaining carbon

2,795 billion tons of CO<sub>2</sub>

Emissions from burning all known reserves of coal, oil and gas

### Remaining carbon budget

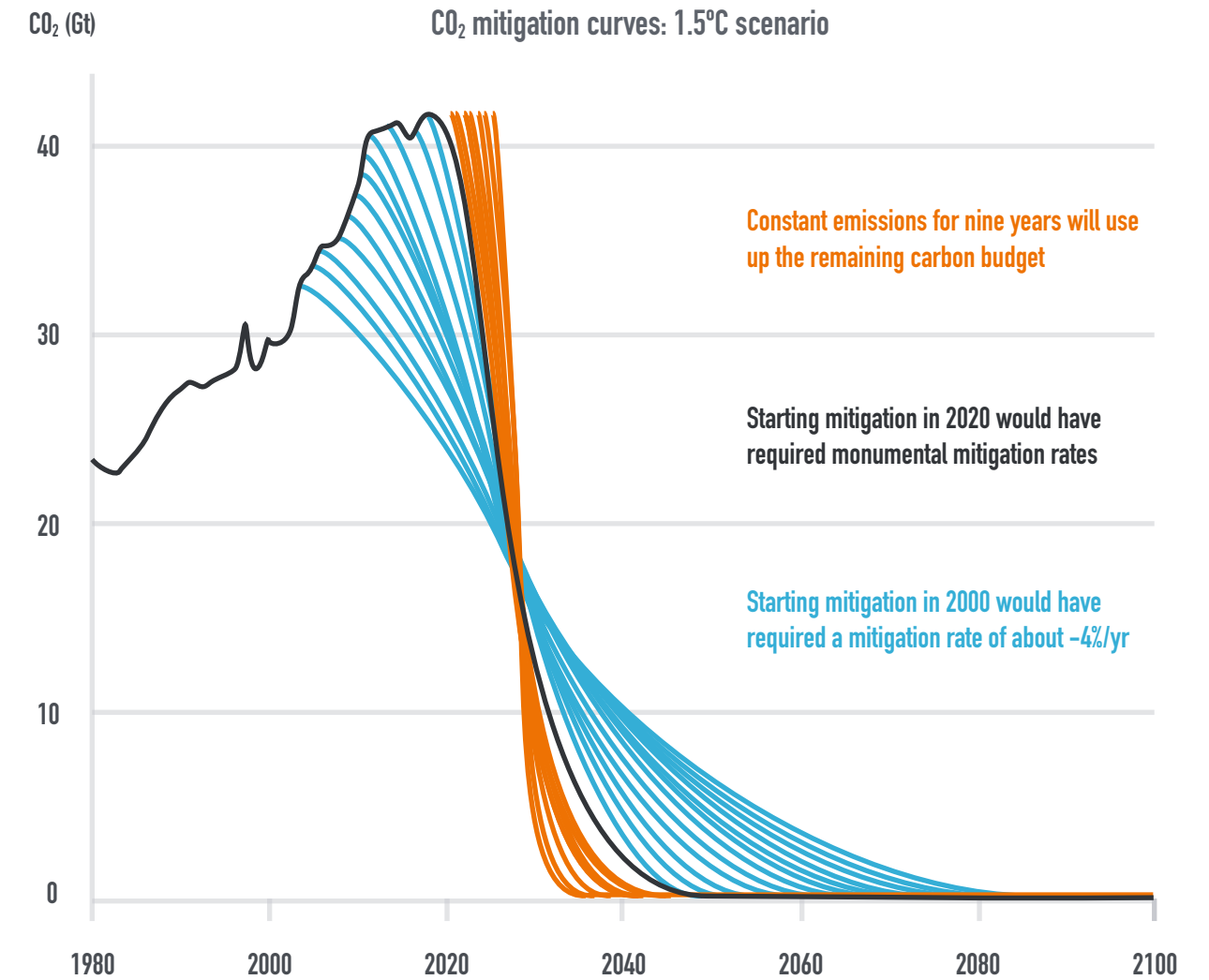
565 billion tons of CO<sub>2</sub>

This is how much CO<sub>2</sub> can be emitted until 2050 while preserving a reasonable chance of staying below 2 degrees Celsius of global warming

Source: Cicero, Andrew Robbins, 'CO<sub>2</sub> mitigation curves to limit global heating to 1.5°C above pre-industrial levels', 2019

## The cost of delay

CO<sub>2</sub> mitigation curves: 1.5°C scenario



Source: Cicero, Andrew Robbins, 'CO<sub>2</sub> mitigation curves to limit global heating to 1.5°C above pre-industrial levels', 2019

03

HUMANS  
BEHAVING  
BADLY



**“A common mistake that people make  
when trying to design something completely foolproof  
is to underestimate the ingenuity of complete fools.”**

— Douglas Adams, *The Hitchhiker’s Guide to the Galaxy*

## PSYCHOLOGICAL FOIBLES AND THE CLIMATE MOUNTAIN

Academics continue to squabble about whether we are truly rational beings. And if our response to climate change is anything to go by, the prognosis does not look good.

That small point aside, experts are starting to realise they have been looking at the problem the wrong way around. It is not that we are irrational per se, there are just serious cognitive limits (or bounds) to our rationality. To put it another way, we are far more like Homer Simpson than we would care to admit, and do not make decisions in a cold, Spock-like manner.

Much of the recent surge in interest in behavioural economics can be explained by this realisation. For years our complex psychological motivations were ‘assumed’ away by an academic discipline obsessed with false precision. Skip, or doze through, the first economics lecture at university and you could easily spend the next three years walking around in utter confusion, wondering whether your chosen field of study bears any resemblance to the real world.

Thanks to many inspiring economists, this is changing. Human nature, with all its quirks and inconsistencies, is being placed firmly back into the textbooks and models. After all, as Charlie Munger once famously quipped, *“How could economics not be behavioural? If it isn’t behavioural, what the hell is it?”* Indeed, at his MacArthur Foundation fellowship speech in 1984 Amos Tversky, one of the founding fathers of behavioural economics, said: *“What we do is take what is already instinctively known by used-car salesmen and advertising executives, and we examine it in a scientific way.”*

At the last count, the list of behavioural biases listed on Wikipedia runs to well over 100. Add in social biases and you are looking at close to 300.

There simply isn’t space to cover all of them here. However, heavyweights such as loss aversion, short-termism, overconfidence, optimism bias, the ostrich effect and status quo bias will, among others, all feature. Even accounting for some overlap, the sheer volume should give you a sense of the cognitive challenges we all face every day.

We also face a climate time-horizon paradox. Behavioural psychologists estimate the optimal learning feedback loop is one to two seconds between stimulus and response. Despite its effects already being vividly evident across the world, the 50-year time horizon many people think of climate change in is far from optimal.

Perhaps to cope, most of the time we wander around oblivious, merrily on autopilot, allowing our unconscious mind to make decisions. Many of these instinctive behaviours can be traced back millennia, to when we were roaming around Africa in search of food and shelter. Our mental circuitry simply wasn’t built for worrying about abstract concepts like mortgages, climate change or the meaning of life.

Instead, we were built for survival, so have always cooperated with and relied on others to help us achieve that end. This often gets neglected in the age-old nature versus nurture debate over what controls our personality traits and behaviour patterns. However, several enlightened academics now recognise that our behaviours have ‘externalities’ – i.e. we influence, and are influenced by, others.

Understanding this, and broadening the behavioural debate away from its narrow focus on the individual operating in a rational vacuum, will be key to understanding and breaking down the climate change challenge into manageable, bitesize chunks. Ignore the next chapter at your own peril.

# A GIANT MARSHMALLOW TEST?

In 1972 Walter Mischel, a psychology professor at Stanford University, conducted a groundbreaking test that has been replicated many times over. The question he wanted to answer was simple: Do children who have more self-control, and can forgo a short-term reward (e.g. a marshmallow) for a bigger reward if they can wait, do better in life as result?

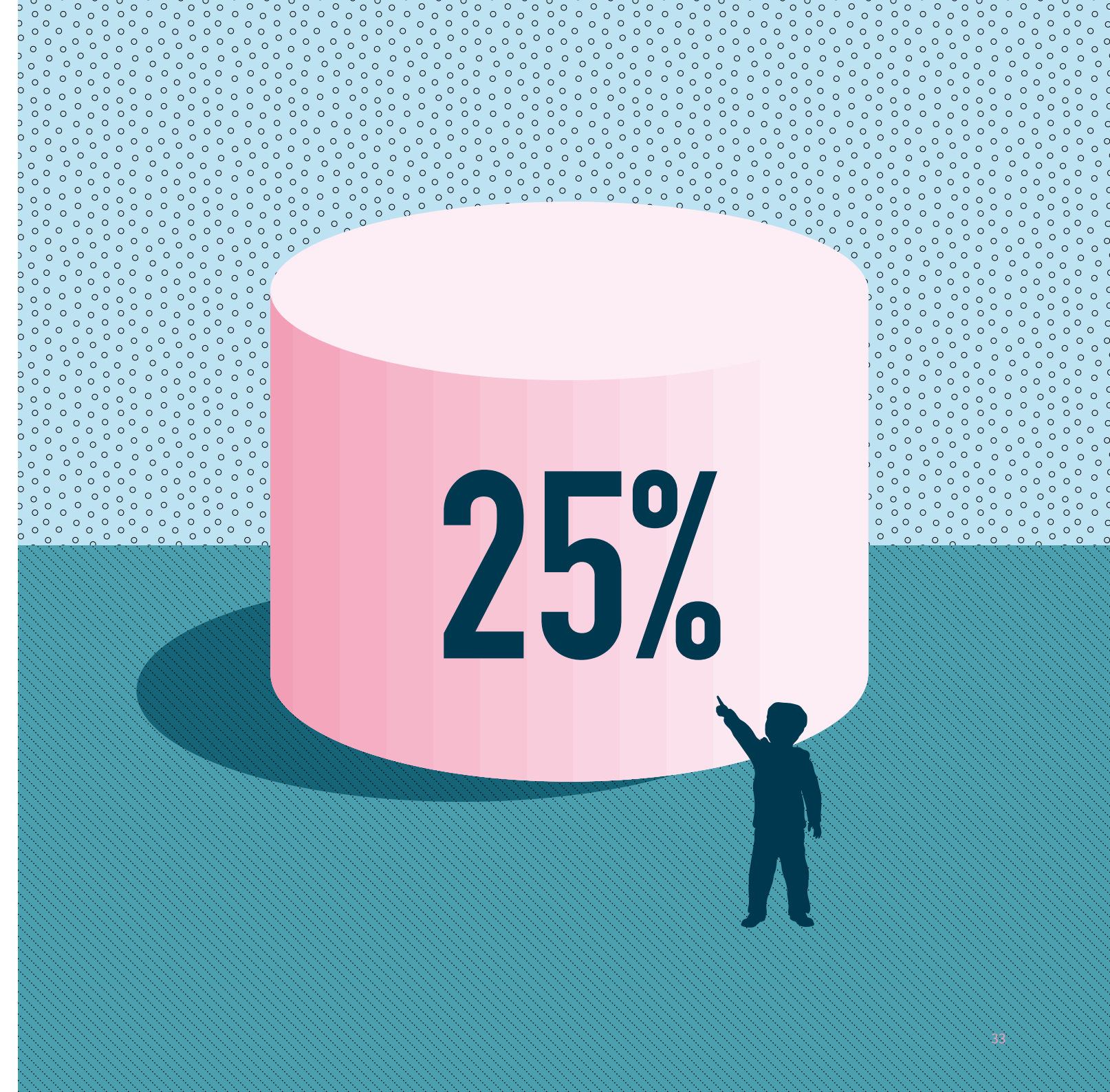
Despite some question marks over replicability and causality, the marshmallow test does offer us a general lesson about self-restraint. Mischel's logic was that those who could control their short-term impulses would be more likely to work hard in school (versus playing up or playing truant) and later in the workplace, thereby creating a (more) successful life.

The situation we all find ourselves in now is eerily similar: welcome to the *giant marshmallow test*.

Can we forgo our energy-guzzling habits and/or spend time, money and effort thinking of innovative ways to solve the challenges climate change poses? Or will our cravings win out, causing us to prioritise the here and now? These are the difficult questions we all face as we come to terms with the effects and implications of climate change. How we all choose to respond will collectively decide the future of our planet.

In Mischel's marshmallow experiment, only a quarter of the subjects were able to resist eating the marshmallow for 15 minutes. Albeit only a sample of the population, this figure does not inspire much hope in our fate. It is fair to say we need far more than this percentage to start delaying, or at least reframing, gratification if we are to tackle climate change effectively.

But before you get too depressed, please do read on. This book is about finding adaptive and mitigating ways to improve that 25 per cent number, while simultaneously working on technological and nature-based measures to ensure we actually don't have to change all that much after all.



# ATTENTION DEFICIT

## WHAT WE CHOOSE TO FOCUS ON MATTERS

The comparison of ‘Charlie bit my finger’ to Greta Thunberg views on YouTube is deliberately provocative and selective. Our message is certainly not that everyone should spend their spare time watching activists talk about climate change and leaving no time for fun. However, we do want to remind people that what we attend to, where we choose to direct the force of our minds and intellect, will make a huge difference in the aggregate.

The media, of course, has historically driven much of our focus and attention. And regardless of your views of their efficacy in delivering that public service, it is not yet clear whether Big Tech companies are doing any better. In traditional media sources, column inches on climate change are on the rise. Global initiatives spearheaded by the UN, such as the Sustainable Development Goals and the intergovernmental (COP) climate conferences ensure the subject does not fall off the agenda. Yet this is also one of those subjects where it will pay for us to take an active interest – for us not to be spoon-fed.

Tim Wu, American lawyer and author of *The Attention Merchants*, concludes his book by saying: “If we desire a future that avoids ... the narcosis of the consumer and celebrity culture, we must first acknowledge the preciousness of our attention and resolve not to part with it as cheaply or unthinkingly as we so often have. And then we must act, individually and collectively, to make our attention our own again, and so reclaim ownership of the very experience of living.”

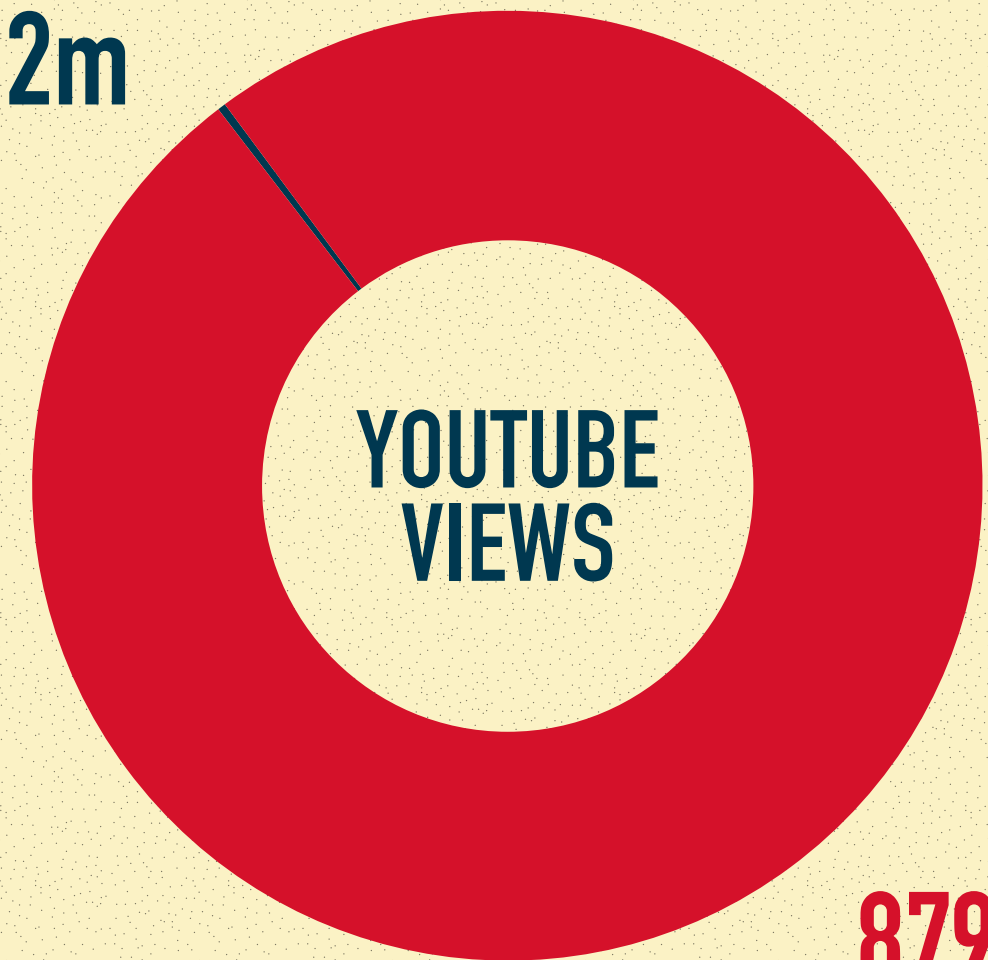
Reclaiming our attention. It is a powerful notion and not one we can achieve without significant cognitive effort and discipline. Fighting back against having our attention pushed and pulled around by tech giants and advertisers will take serious willpower.

Wu’s words also imply the role of celebrity influencers could be crucial in delivering the climate message. To that end, it is encouraging that influential musicians like Lil Dicky are picking up the baton and trying to push the subject up people’s agenda. His Earth Song, released three days before Earth Day in 2019, while not to these authors’ taste, has undoubtedly reached far more people than we ever could. In a similar vein, research by Stanford psychologist Albert Bandura also points to the power of soap operas to influence behavioural change in communities.

Climate change is effectively what happens while we’re making other plans. Or, as William James put it: “Our experience is what we attend to.”

Greta Thunberg at the Climate Action Summit

1.2m



879m

Charlie bit my finger – again !

Source: YouTube, 2021

# THE TYRANNY OF CONVENIENCE

## NOW, NOW, NOW.

Our individual and collective patience is under severe pressure as our ability to wait for things seems to be dwindling by the second. It does not help that our every whim can be catered for in an instant. Faster and faster internet speeds, smartphones, social media and online shopping have undoubtedly made things worse, but we cannot absolve ourselves of responsibility for this loss of fortitude.

Part of the solution to this dilemma will involve creating new habits; new ways of reacting to situations or stressors. Yet understanding how to hack bad habits, or simply create the right ones, is a never-ending struggle as we find distractions everywhere.

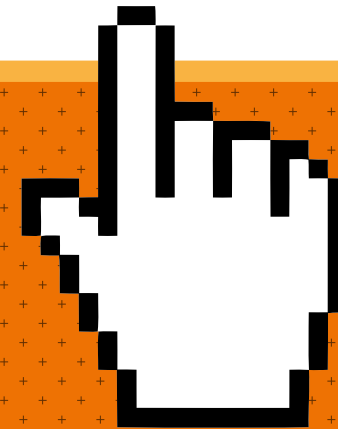
An article by Jerome Groopman called ‘*Can Brain Science Help Us Break Bad Habits?*’ in *The New Yorker* provides some hope. He explains that in one version of the marshmallow test researchers split the groups. One group could see the marshmallow; the other was aware of it, but couldn’t actually see it. On average, those in the latter group lasted four minutes longer (ten minutes in total) before yielding to temptation. Taking willpower out of the equation is therefore key to creating more situational control.

Another part of the issue is understanding that our actions have consequences, many of them unintended. Take emails, in particular hitting ‘reply all’. That action has a consequence. A study commissioned by energy company OVO estimates that 64 million unnecessary emails are sent in the UK every day. It went on to suggest that if we all sent one fewer ‘thank you’ email a day the UK would save more than 16,000 tonnes of carbon a year – equivalent to 81,152 flights to Madrid or taking 3,334 diesel cars off the road. Recognising that the simple act of sending an email requires electricity, both locally and in the cloud, is a useful mindset for all of us to adopt.

Compulsive eating habits are referred to as disorders. Yet no such connection is made between some of our compulsive everyday behaviour and its impact on the climate. At least by acknowledging the potential downsides of habitually expecting everything at the click of a button, we should be able to check ourselves every now and again to explore the true cost of our impulses.

“ I love Amazon 1-Click ordering.  
Because if it takes two clicks,  
I don’t even want it anymore. ”

— Jerry Seinfeld, comedian





# BEHAVIOURAL WILDFIRE

## THE DANGERS OF PEER PRESSURE

Ok, hands up who did the ice bucket challenge back in the summer of 2014?

We like to think of ourselves as free-spirited individuals, fully in control of our actions. While true to some extent, an unflinching belief in free will seriously understates the role of social conformity – or rather peer pressure – in shaping our behaviour.

Next question: Who actually remembers the charity that the ice bucket challenge supported? It is impossible to know the exact proportion, but an educated guess suggests it is a mere fraction of the number who took part. This, in itself, is not a major problem. After all, amyotrophic lateral sclerosis is a worthy cause and kudos to the marketing team for tapping into our social fabric and creating a viral campaign that raised over \$220m worldwide.

The broader problem can be highlighted by posing another simple question: Would you like your hard-earned money to go to charities that reflect your core values, or simply to the one with the best marketing team?

It is a serious question. Sometimes our unthinking actions, influenced heavily by what others around us do and think, can have unintended consequences – in this case, leaving shortfalls of money in some charitable areas, while overwhelming the existing resources in another.

The linkages with climate change should be obvious. Our consumption habits, or expenditure cascades as economist Robert Frank calls them, create a never-ending desire for more. Worryingly, the things we crave as a result of judging ourselves relative to others are not necessarily good for the planet: petrol-guzzling cars, bigger houses, carbon-intensive holidays, imported food and drink, beef. The list goes on. Despite their allure, nor are these things always good for us as individuals. Bigger houses equal social isolation. Diets heavy on meat are not necessarily the healthiest.

Another challenge is financial, because many of these goods are what Frank calls positional goods. By this he means we get into bidding wars with each other for them, driving their prices higher and higher without an equivalent increase in satisfaction. How much extra pleasure can owning a car that does 0-60 miles per hour in three seconds versus one that takes a few more really give you?





# THE OVERVIEW DEFECT

## BYSTANDERS, FREE-RIDERS AND THE TRAGEDY OF THE COMMONS

Astronauts coined the ‘Overview Effect’ quite some time ago. It essentially refers to the perspective people get when they travel thousands of miles into space and look back at the planet we all call home. Once you have been into space and seen the Earth in all its splendour, you seemingly never look at the world in the same way again. One can only hope that Messrs Bezos and Musk have similar Damascene conversions following their rocket-fuelled trips.

Why is this important? Three main reasons jump out: bystanders, free-riders and the tragedy of the commons.

These concepts, identified and labelled by economists, are both intuitive and fundamentally linked. They all imply the majority of us rely on others to do the right thing, meaning we either do nothing or, worse still, try to cheat the system.

Anyone who has ever chaired a conference call and requested comment from a group of individuals only to be met with a tumbleweed-like silence will have an understanding of the bystander effect. However, the most famous example of the effect is the murder of Catherine ‘Kitty’ Genovese in 1964. As the story goes, the 28-year-old was returning home from work and was attacked. Despite her repeated calls for help, none of the dozen or so people nearby who heard her cries called the police to report the incident. Everyone stood idly by and assumed someone else would intervene.

Though the case has been subject to numerous misrepresentations, there are other examples that prove the social power of diffused responsibility – i.e. our tendency when part of a large crowd to stand by and rely on others. The war of attrition that takes place in student houses before someone gives in and does the cleaning (typically the person with the lowest tolerance for germs) is a classic example of free-riding.

Unfortunately, climate change presents the perfect conditions for bystanders and free-riders to thrive in. Worse still, when added together they both conspire to create the ultimate tragedy of the commons. On some level at least, these phenomena have been understood for millennia; as the Chinese proverb opposite aptly states, the common area (i.e. the planet) is so often neglected.

Perhaps it is time to retrieve a little bit of that ancient wisdom and to think a little more like astronauts. By identifying ourselves as global citizens and resisting the diffusion of responsibility that comes with large crowds, we should be more likely to take care of the planet. After all, we cannot rely on others to solve this for us, and certainly shouldn’t exploit situations that arise thanks to our altruistic neighbours.

Get sweeping.



“There is no one to sweep a common hall.” – Chinese Proverb

# WHAT HAVE THE FOSSIL FUEL COMPANIES EVER DONE FOR US?

To be clear, we are absolutely *NOT* advocating the use of fossil fuels.

If we are to have any chance of meeting the goals set out in the Paris Agreement, we must transition away from carbon-intensive energy toward cleaner energy sources. This is non-negotiable. Nor do we endorse the lobbying, corruption, subsidies, misinformation campaigns and questionable safety standards the industry has been caught up in.

Instead, we seek to provoke an understanding of our respective roles in the continued demand for carbon-intense and dirty fuel. The transition will not be easy, nor indeed comfortable. But removing ownership and agency will not help anyone. The production of fossil fuel-based energy is as much (if not more) a demand problem as it is one of supply. We all use the industry's products every day to support our lives. According to Carbon Tracker, an independent climate think tank, the majority of lifecycle emissions (known as Scope 3) are incurred when they are actually consumed – 85 per cent or more for a barrel of oil.

Vilifying fossil fuel companies, therefore, might not be the best way of attacking the problem. Instead, viewing these entities as energy companies, and engaging with them over timeframes for adaptation, mitigation and overall transition, might lead us all to a better place. Their balance sheets, experience, scientific and engineering knowledge, as well as their geopolitical instincts, could prove extremely useful as we embark on the epic transition from dirty to clean fuel.

Indeed, as Lauren Cohen, Umit G. Gurun and Quoc H. Nguyen point out in their recent research paper '*The ESG-Innovation Disconnect: Evidence from Green Patenting*', energy firms are key innovators in the US. They produce more, and significantly higher-quality, green patents.

By painting fossil fuel companies as evil, we conveniently forget the role we have all played with our insatiable demand to get from one place to another quicker, to travel further, to see more, to eat out-of-season produce, and to receive next-day deliveries. Their misdeeds act as a direct mirror to our greed and indulgence.

None of this downplays the challenge these companies will face in overhauling their businesses: silos, embedded joint ventures and dividend-addicted investors are powerful forces. However, to not recognise our own role in the energy conundrum is a little disingenuous. As Walt Whitman put in his '*Song of Myself*': "*Do I contradict myself? Very well then I contradict myself, (I am large, I contain multitudes.)*" The same is true for all of us.

There is a delicate balancing act to be found within the climate movement in demanding change without creating unhelpful good versus evil in-out groups. There are always two sides to every story. In true Monty Python-style, we should always question our assumptions.

All right, apart from refrigeration, transportation, powering life-saving medical procedures, enabling social mobility, expanding cultural understanding and empathy, facilitating education, exponentially increasing crop yields, heating our homes, and providing millions with jobs and pensions, what have the fossil fuel companies ever done for us?



...Er, saved the whales?

# THE POWER OF VESTED INTERESTS

One of the many challenges we face in this climate fight is overcoming those who have a vested interest in keeping things as they are.

The Upton Sinclair quote opposite reveals much of what is going on. But Tim Harford, in his *Cautionary Tales* podcast, takes us a little deeper into the riddle of vested interests.

Harford tells us of the remarkable reluctance of the British Army to embrace tanks in World War I, in favour of the continued use of horses. Clear-minded military strategist J.F.C. Fuller drew up plans for the incorporation of modern armoured vehicles into military warfare. Entranced by a deep, emotional connection to horses that embodied status and nobility, the higher ranks of the British Army failed to see the same writing on wall and ignored Fuller's 'Plan 1919'. Eventually, as part of Blitzkrieg, the Germans used the tactic against them in World War II.

The pace of change was not the issue. Instead, old hierarchies and organisational ways of doing things tripped the British Army up. Rebecca Henderson points out that, in addition to technological innovation, a form of "architectural innovation" is required for disruptive opportunities to be exploited or at least navigated effectively. Institutional inertia can be rigid and sclerotic, with the words "*But we've always done it this way*" arguably the most dangerous in any organisation's culture.

Vested interests and outdated thinking are rife when it comes to climate change. If we are to tackle such a gigantic problem, we must ensure that our mindsets, our organisations, and our institutions are open-minded and flexible enough to embrace new ways of thinking and working.

David Wallace-Wells estimates that it would take \$3 trillion a year for carbon capture and storage technology to offset the current 32 gigatons of carbon dioxide emitted globally. While a clearly sizeable sum, he also points out total annual global fossil fuel subsidies are approximately \$5 trillion.

This, and Harford's cautionary tale, bring to mind a brilliant cartoon from *The Economist* that laid bare the Australian government's totally muddled response to soaring temperatures and devastating wildfires. It depicted a giant man with a watering can walking across Australia trying to fan out the flames. Strapped to his back was a leaking petrol cannister that represented the government's mining subsidy payments, which were stoking the very flames he had just put out.

Vested interests are a powerful force to overcome.

**"It is difficult to get a man to understand something, when his salary depends on his not understanding it."**

**- Upton Sinclair, writer & political activist**



# ICE CREAMS, THE GYM AND SKEWED MENTAL ACCOUNTING

The accounting equations we compute in our heads are often slightly wonky. Go for a run, offset that by devouring some cake on your return. Despite all the technological aids at our disposal, few of us ever bother to check if the sums actually even out. We place our faith in the ancient religion of balance, with ying and yang magically harmonising the scores.

Unfortunately, we are often terrible at gauging relative amounts, particularly when it comes to large numbers. This causes extra problems for our mental accounting juggling act. Worse still, these imbalances, when multiplied through society, can be eye-wateringly large.

Take the example of trying to conserve water by taking shorter showers each day. A noble attempt, just so long as you realise while enjoying your steak for dinner that a mere two pounds of beef uses the equivalent amount of water as showering every day for an entire year.

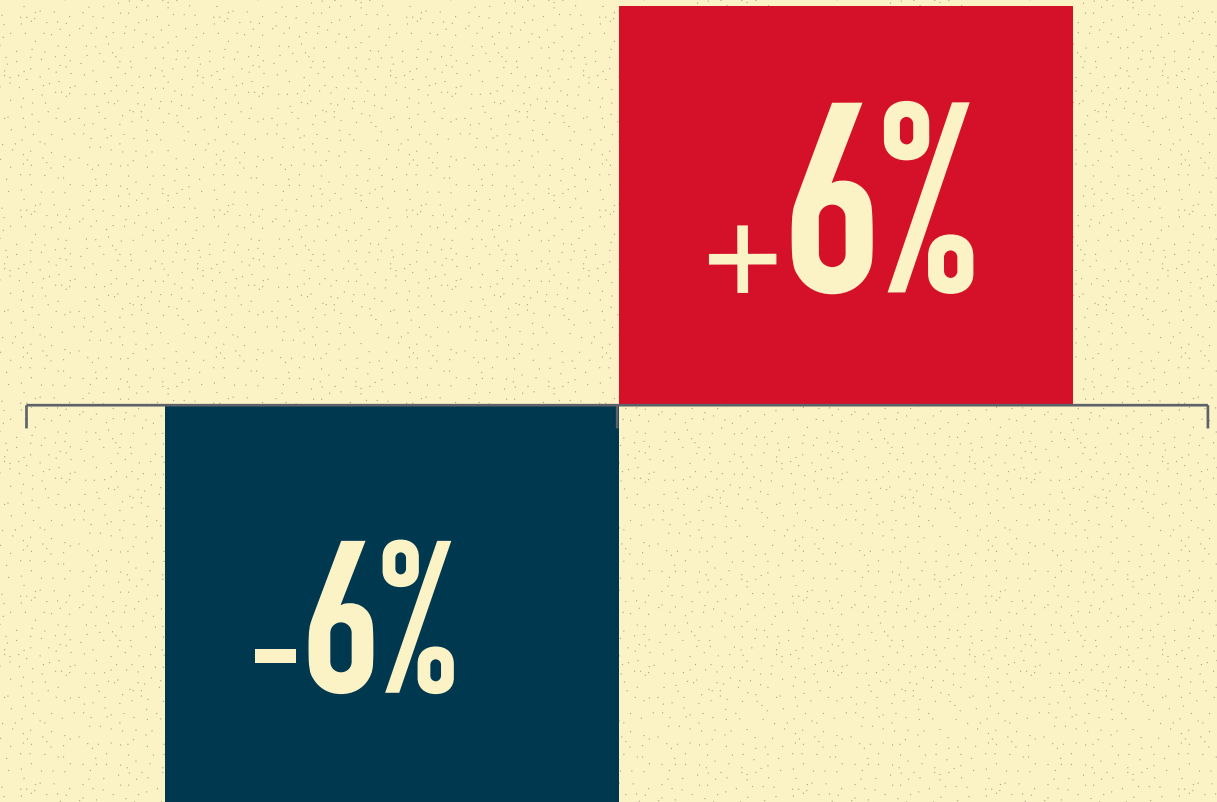
Equally, some studies show that using 'green' products can encourage people to adopt less altruistic attitudes elsewhere – something called moral licensing. For example, in their study *'Do Green Products Make Us Better People?'*, Nina Mazar and Chen-Bo Zhong of the University of Toronto found that by purchasing green products we may give ourselves license to indulgence in self-interested and unethical behaviours. This is backed up by Columbia University psychologist Elke Weber, who argues people suffer from "single action bias". Indeed, numerous studies show that people who buy energy-efficient light bulbs typically up their usage. Similar trends apply to insulation and the use of thermostats.

Another experiment in 2013 by Tiefenbeck et al. sent notes to residents in a Boston apartment, asking them to save water to "help preserve the environment". It worked. On average they used six per cent less water; unfortunately, they also compensated by increasing their electricity usage by almost the same amount. Many other studies, though not all, show similar effects.

Perhaps the biggest blind spot of all, though, is our collective failure to realise the power lying dormant in our respective pensions and investment savings. At last count, consultant Willis Towers Watson put the sum of UK pensions at close to £3 trillion. That's a lot of financial firepower and investing it sustainably would arguably achieve far more than some other personal lifestyle changes.

This disconnect between the intentions behind our actions and their overall impact is troubling. By not accurately (or even roughly) applying proportional weightings to our actions, it is extremely hard to get a meaningful sense of how our aggregate behaviour is affecting the planet. It might be worth talking to those accountants at dinner parties after all.

Good offset by bad



Six per cent less water usage.  
Compensated for by using **six per cent more electricity.**

Source: Tiefenbeck et al., 2013

# WHY OSTRICHES LOVE THE STATUS QUO

Biologist and neuroscientist Robert Sapolsky tells a great story of how he became interested in stress and memory – a passion that eventually saw him visit the Maasai Mara in Kenya for six weeks every year to study stress response levels in baboons.

During his graduation week at college Sapolsky was intrigued to see many of the visiting parents getting their cars clamped or towed because they couldn't read parking signs, or continually lost as they struggled to find their way around campus. These were all very accomplished people, by the way – judges, lawyers, doctors and the like. It dawned on Sapolsky that once you reach a certain age you close down to novelty and things that are unfamiliar. He argues that beyond the age of 35 we tend to lose some of our spirit of adventure. Studies of tastes in music and food tend to corroborate his view.

So why is this relevant, and why waste so much precious time and space telling Sapolsky's back story?

Well, his insight draws attention to the Ostrich Effect – our love of the existing order that permeates deep into our daily lives. New situations and their accompanying decisions can be stressful. This, and the paralysis that so often accompanies uncertainty, makes embracing change ludicrously difficult. Economists William Samuelson and Richard Jay Zeckhauser called this “status quo bias”, following a series of decision-making tests they carried out.

It is this that makes behavioural economist Daniel Kahneman so gravely pessimistic about our ability to solve the climate challenge. Its slippery deadline and geographic focal point, multiple causes and solutions, and lack of a clear enemy make it (for some) the ultimate ‘wicked’ problem. It's also abstract, and seemingly far off in the distance. And when combined with our natural tendency to resist change, to not want to make (potential) sacrifices for our way of living, it is easy to see where Kahneman gets his pessimism from.

But understanding the dark force of inertia marks the first step in conquering it. After all, as the absurdly simple logic has it, “nothing ever changes by staying the same”.

“People say nothing is impossible,  
but I do nothing every day.”

— Winnie the Pooh





# LORAX AND THE GREAT CARBON RUSH

The carbon offsetting market just keeps getting *biggerer* and *biggerer*, as Dr. Seuss might put it!

Though an encouraging sign of increased climate awareness, this trend is not entirely without concern. For example, the Oxford Principles for Net Zero Aligned Carbon Offsetting recommends that emissions reduction, carbon removal, long-lived storage and offsets be approached in precisely that order.

The report's language is crystal clear: carbon offsets should be used as a *last resort*. Yes, that's right: offsetting as a last resort. Human nature, though, gravitates toward the path of least resistance – the bare minimum. And reducing emissions is far harder than writing an offsetting cheque.

Given that the Bank of England recently predicted the price of carbon could go to \$150, there is a lot of potential gain for those in the offset market willing to help ease our collective conscience. Whether it be forests, woodlands or peat bogs, natural carbon sequestration properties will be in high demand over the coming years – as will technological solutions like carbon capture and storage. Ownership (either public or private), moral integrity and communal access to nature-based havens will be crucial to making any offsetting and trading schemes work.

The green greed-frenzy will not just be about trees and conservation areas, though. Just like in the American Gold Rush of the mid-1800s, precious metals (though this time ones like lithium and cobalt) that are vital battery components of the green transition will be highly prized, as *The Economist*

points out in an article called '*Bunged Up*'. The ethics of digging them up, fights over ownership rights, and the responsible recycling or disposal of these scarce geological gems will require great diplomacy and community spirit.

Dr. Seuss foresaw all of this. The genius of *The Lorax* is that he was able to convey a complex and important environmental message to adults through a children's book. It was undoubtedly ahead of its time when first published as far back as 1971. The conflict between the commercial and polluting Once-ler and the feisty Lorax, who "*speaks for the trees*", feels more relevant than ever.

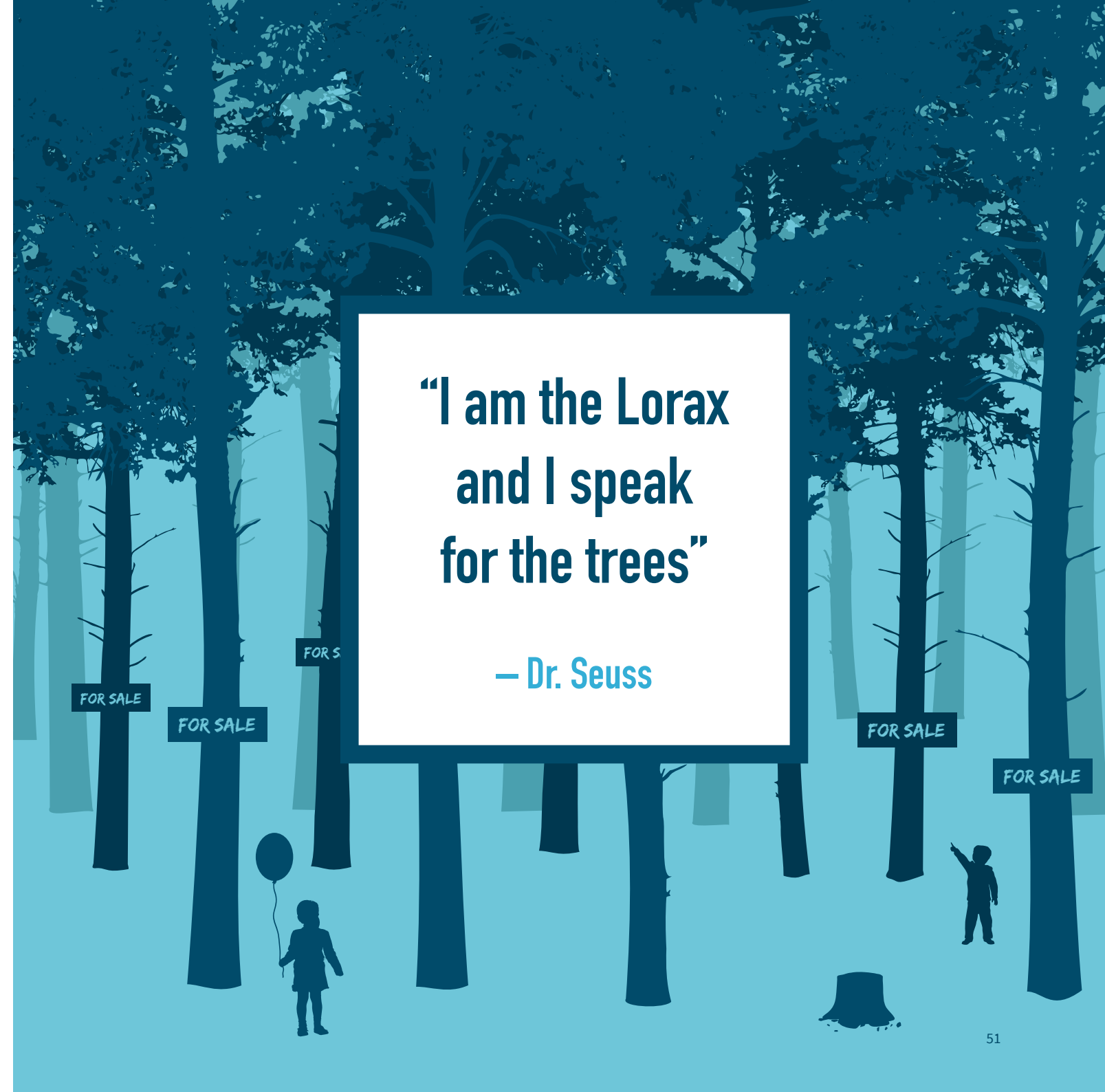
A delicate balancing act between entrepreneurial spirit and outright selfishness will inevitably ensue. And in terms of forests and woodlands, it would be a real shame if greed wins out and private interests end up trumping local community needs.

Speaking to NPR, Wanjira Mathai, vice president and regional director for Africa at The World Resources Institute, retains a sliver of positivity: "*My mother ... always talked about trees as a symbol of hope and so The Lorax in many ways was that and remains that for me. That each of us can be such a potent agent of change. We can be custodians of hope.*"

We wonder what Dr. Seuss's Lorax would have to say about this newfound, sometimes less-than-pure, love of trees. With time running out Mathai reminds us that, "*The Once-ler saved that one seed and waited for someone who cared to come along. It will take each of us doing our part to reverse what is coming.*"

**"I am the Lorax  
and I speak  
for the trees"**

**— Dr. Seuss**



# LACK OF IMAGINATION

They say that one of the first things we lose as we grow from children into adults is our imagination. Something happens during puberty that makes us more self-conscious. We start to care about what others think of us, and it stifles our playfulness and creativity.

The implications for society are significant. Paul Farmer, arguably *the* leading expert in global health, describes the failure to provide global health solutions to the very poor in society as a failure of imagination – not of finance, innovation or technology.

The same can be said of climate change. The sun emits an inordinate amount of capturable energy, mind-bendingly more than we use. Other renewable energy sources, like wind and hydro, while not quite as abundant, are still beacons of hope in the green energy charge.

Carbon capture and storage technologies are also being developed as we write, but delivering them at affordable prices will take time, ingenuity and significant funding. So, while we cannot wait for technology to swoop in and save the day (i.e. we must change our everyday behaviours), continued investment in renewable energy and carbon mitigation solutions will be vitally important to help us avert disaster. What is more, our consumption habits can drive technological change by shifting supply and demand dynamics.

Harvard physicist David Keith and his collaborators have published details of a prototype technology that could soon have the capacity to remove carbon from the atmosphere at a cost of less than \$100 a ton. This cost should only come down with continued innovation.

Of course, issues with storage, transportation, intermittence and geopolitics exist. However, the map opposite is accurate. Created by Land Art Generator and based on IEA data, it shows that, in theory, we wouldn't have to sacrifice much surface land area to switch to cleaner energy. A similar map exists for wind and, although it uses up a little more overall surface space, the turbine farms are predominantly based offshore.

Below is an extract from energy expert Daniel Yergin's book *The Quest – Energy, security, and the remaking of the modern world*:

*“But what provides for reasoned confidence is the increasing availability of what may be the most important resource of all – human creativity. A famous geologist once said: ‘Oil is found in the minds of men.’ We can amend that to say that the energy solutions for the twenty-first century will be found in the minds of people around the world. And that resource base is growing.”*

Powerful stuff.



## Surface area required to power the world with zero carbon emissions and with solar alone

Source: Land Art Generator (based on IEA data).

# THE TROUBLE WITH JUDGING CLIMATE RISK

By now it should be clear that human beings are complex.

Neuroscientist Michael Graziano offers a grounded and intelligent perspective on how hardwired some of our attitudes toward risk really are: *“If the wind rustles the grass and you misinterpret it as a lion, no harm done. But if you fail to detect an actual lion, you’re taken out of the gene pool.”*

This helps explain why we are generally risk averse. But it only really relates to the risks we can easily see. What about the risks that aren’t so easily seen, the ones that lurk in the shadows and whose abstract nature makes them harder to comprehend, like climate change?

Our response to these is, unfortunately, much more complicated. For example, people over-indulge in antibiotics because their short-term ailment seems more important than the (less visible) long-term damage antibiotics will do to their microbiota. Immediacy wins – and the global risk of antimicrobial resistance grows.

When you mix conformity bias together with our tendency to underestimate the frequency of extreme events, dealing with thornier, so-called ‘wicked’ threats becomes a minefield. Situational and cultural context adds additional layers of complication.

These strange and inconsistent perceptions of risk matter because they affect how we respond, both individually and institutionally.

By way of example, since 2005, hurricanes, storms and floods in New Orleans, Houston, Puerto Rico and the New York area

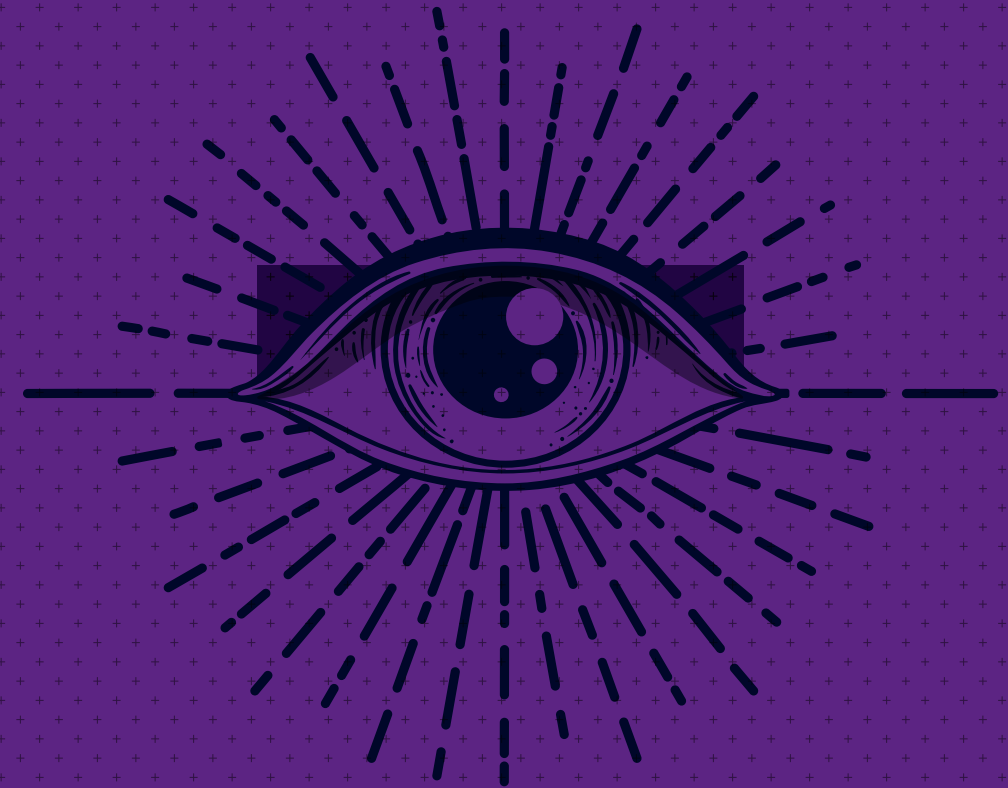
have killed over 4,000 people. This is more than 9/11, and almost double the number of US soldiers killed in active duty in Afghanistan since 2001. Yet terrorism’s more tangible and immediate guise attracted more worry, money and political action. Until we see climate change as a genuine risk, we will underweight the amount of time, money and resources we throw at it.

Perhaps our confused attempts to accurately judge risk can be explained by making the distinction between risk and uncertainty, as economists John Maynard Keynes and Frank Knight did back in the 1920s. They figured out that risk can be measured, whereas uncertainty cannot. Unfortunately, we have to live with both.

With climate change it therefore seems prudent to heed risk theorist Nassim Nicholas Taleb’s precautionary principle and err on the side of caution (leaning on our more primitive self). Globalisation, mass consumerism, urbanisation, increased travel, meat-heavy diets: are all trends that have a host of interrelated and global consequences. Some intended, many not. Some predictable, others not. Some positive, most not.

It might also be worth (re)reading the work of economist Hyman Minsky. He knew better than anyone that stability leads to instability and that it is human nature to ignore the dangers as the good times roll. In the process, unseen risks build to a palpable level. The planet, the climate, the diversity of species, our societal- and market-based systems: they are all connected.

To not recognise this would be a grave error.



**“We are going to do better, and be happier, if we start by recognising that we’ll never be sure of the future.”**

**– Annie Duke, decision-making expert**



# WHEN THE CLIMATE DOGS DON'T BARK

We struggle to imagine parallel universes. This is perfectly understandable. Such an imaginative leap takes time and effort.

If, however, we are to mount an effective response to climate change we will need to get far better at it. The reason is down to the prevention paradox, an almighty irony of any success we manage to achieve.

Imagine that we manage to act quickly enough to avert the worst-case scenario (the Intergovernmental Panel on Climate Change currently models this at seven degrees Celsius above pre-industrial levels). By the way, this would represent the collapse of civilisation as we know it. But let's park that for now. Let's be more upbeat and ambitious and imagine that we keep global temperatures to below two degrees above pre-industrial levels.

If that happens, thanks to Herculean efforts at all levels of society, then we will never know the extent of how severe things could have been, or even how close we came to total destruction. It is a bit like a Mission Impossible film, where most of us are Tom Cruise, gallantly trying to save the world while the deniers, sceptics and inattentive are all oblivious to the narrowly missed threat.

Shifting Baseline Syndrome – the gradual change in the accepted norms for the condition of the natural environment due to a lack of experience, memory and/or knowledge of the past – will not help matters either.

Admittedly, we have had more than our fair share of warning signs over the last decade (or four!). Devastating heatwaves, wildfires, floods and so on. But if we do manage to get things back under control, there will be a natural tendency to underplay how bad things could have been and to not necessarily appreciate the calming effect of our active interventions. Anyone remember the Millennium Bug? This is human nature. But it means that many people who were on the right side of the debate may have to bite their tongues as they are repeatedly reminded that *"It wasn't that bad after all, was it?"*

Counterfactuals are fiendishly hard to comprehend. They exist in a universe outside of our own. When detectives turn up to a crime scene, just as they did in Mark Haddon's *The Curious Incident Of The Dog In The Night Time*, they often look for what isn't there as much as what is (e.g. why didn't the dog bark?). In terms of climate change, we might all have to get a little more used to thinking like that.

But perhaps more to the point, future generations will certainly know if we don't avert disaster. And given that we already know we are heading in the wrong direction, this confers a very specific moral obligation on us to act urgently.



# 04

## CONQUERING THE ENEMY WITHIN



**“If somebody thinks they’re a hedgehog, presumably you just give ‘em a mirror and a few pictures of hedgehogs and tell them to sort it out for themselves.”**

— Douglas Adams, *The Hitchhiker’s Guide to the Galaxy*

## REFRAMING NARRATIVES AND FINDING HOPE

In March 2019, a play called *Admissions* opened in the West End in London. Its creator, Joshua Harmon, was clearly out to provoke. Set in the United States, the play uses the college admissions process to make a broader point about race, piercingly unveiling a number of middle-class tensions that exist in some people’s minds and in how they behave.

The majority of the play is centred on Charlie, whose white-privileged parents Sherri and Bill work at an elite private school. Sherri, in particular, has made it her life’s work to increase the diversity of the students that attend and prides herself on her liberal views on equality.

It is here that the conflict erupts; between the parents’ personal and professional views as well as between their family’s interest and that of broader society. Charlie, a top student, fails to get into Yale, while his biracial best friend secures a place, having ticked the ethnicity box on the application form. You start to see the characters’ true colours come out; the two families fall out and their morals disintegrate.

The play is by no means without its flaws, and we won’t spoil the ending. Needless to say, it is a thought-provoking story and one we can all relate to. When our primal instincts kick in, the moral high ground all too often gets sacrificed – and therein lies the link to climate change.

On the surface, climate change looks easier to solve than diversity. The latter requires the privileged to step aside as there are only so many top-tier university places and boardroom jobs to hand out. It is zero-sum: you win, I lose. The playing field for climate change is, thankfully, different. But the inner conflict involved in taking individual active responsibility reads across both issues. What that looks like in practice, we shall all have to make our own respective peace with. Whether or not we each do enough is subjective – something only our conscience can preside over.

The point is that we are all human, replete with emotions and behavioural flaws. This will never change. The ideas that follow are aimed at helping us find ways of coping with these foibles. In essence, this chapter is about nudging; understanding the power of persuasion, incentives and peer pressure to frame our choices and environment (or, ‘choice architecture’ in behavioural economic parlance) in a way that makes it easy for us to do the right thing.

We are under no illusions that most people and institutions will have started this journey already, but the multi-dimensionality of the climate crisis means tackling it from a host of directions is no bad thing.

# PASCAL'S WAGER

## THE GREATEST ASYMMETRIC BET EVER

The climate change debate is non-linear, asymmetric and completely absurd from a philosophical point of view. Blaise Pascal, the seventeenth century French philosopher, mathematician and physicist, would understand exactly why. His logic for thinking about whether God exists reveals a fundamental truth for dealing with climate change.

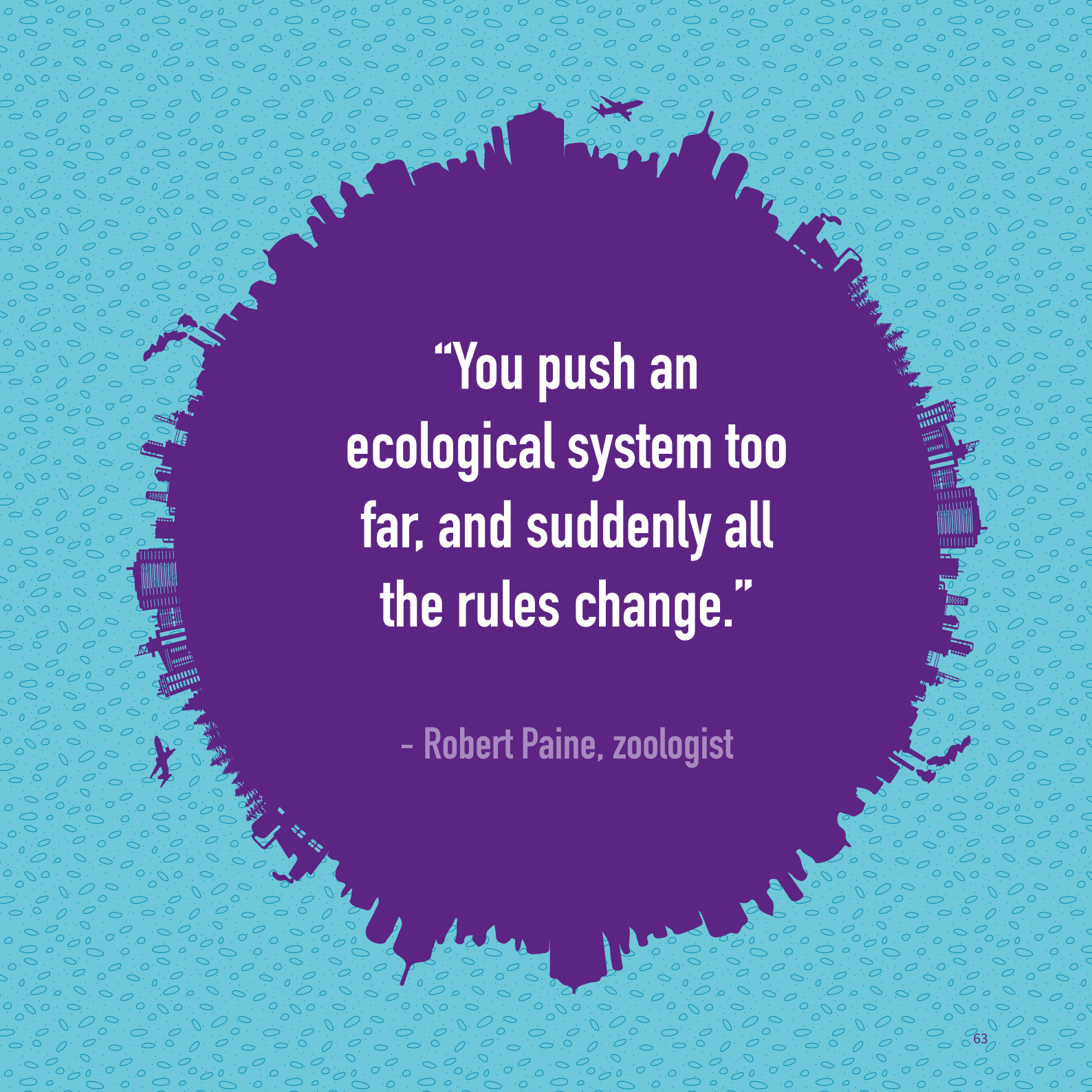
Pascal felt that the only rational way to approach religion is to believe in God and behave as if he exists. He argued that if God does exist the upside of going to heaven for eternity massively outweighs the prospect of going to hell (regardless of however small you think that chance is). Meanwhile, if God doesn't exist, you have only made a small sacrifice during your finite stay on Earth.

And so it is with climate change. The asymmetry in potential outcomes should dictate our behaviour.

At the heart of the issue is that many of the climate and environmental processes we have kick-started are non-linear in nature.

Carbon Brief, a UK-based climate science website, identifies “nine ‘tipping points’ where a changing climate could push parts of the Earth system into abrupt or irreversible change”. These range from Arctic and Antarctic ice-sheet disintegration, to permafrost thawing (releasing large amounts of CO<sub>2</sub> and methane), to biodiversity loss as a result of rainforest degradation. Combined, these forces could easily cause dramatic and irrevocable damage to our planet.

Thomasina, a precocious character in Tom Stoppard's play *Arcadia*, described how hard it is to un-stir jam into porridge. The same is true of carbon and the atmosphere (though scientists are working on it!). Non-linear dynamics and intricate feedback loops could exaggerate any asymmetry and make this quite the humanitarian headache. The risks involved with believing climate change is a hoax and subsequently being wrong do not bear thinking about.



“You push an ecological system too far, and suddenly all the rules change.”

- Robert Paine, zoologist

# POSITIVE STORYTELLING

## IN SEARCH OF WIN-WINS

For as long as we have had language, we have had stories; perhaps even longer. They create social cohesion and bind us together as tribes. This was as true in our cave-dwelling era as it is now. The stories we tell ourselves, our friends and our communities have immense power. They can change the way we think, feel and act.

Telling the right ones is therefore crucial. The words we use, and the narrative arcs we construct to make our points believable and memorable, really do matter. Crudely, stories can be split into two camps: positive and negative.

Research into the type of messages people best respond to is fuzzy; we are all different, with different things pushing our buttons. A delicate balance must be struck.

On the one hand we need to create a sense of urgency to encourage positive action. However, shouting “our house is on fire” from the rooftops might not be the most helpful course of action. It could cause depression, despair and paralysis for many – emotional states not generally conducive to action.

It also needn’t be so. Without wishing to downplay any of the risks and the inevitable social struggles, there are many positive stories to be found in the required transition. For example, eating less meat has some obvious health benefits – not least a reduction in antibiotic consumption, making us less susceptible to antimicrobial resistance, which is a major health threat. This is because many animals are fed antibiotics to artificially fatten them up.

ABC journalist Bill Blakemore argues all this amounts to “A grave failure of professional imagination about how to advance this great and transformative story”.

A new project might help. The Climate Imagination Fellowship, launched by The Center for Science and the Imagination at Arizona State University, aims to bring together leading science-fiction writers with global thinkers, researchers and changemakers with a view to creating positive climate stories – ones that imagine a successful future. The organisers argue that, “*without positive climate futures, visions of climate adaptation and resilience that we can work toward, it’s much harder to motivate broad-based efforts for change in the present*”.

Failing that, humour has an unnerving ability to cut through the noise and reveal life in absurd clarity. Joel Pett, whose witty 2009 cartoon provided the quote opposite, is a good example of someone who understands the inherent positivity lying dormant in the climate change debate. And given the sheer volume of negative storylines swirling around, it would seem to make sense to try and balance things up a little.



“What if it’s a big hoax and we create  
a better world for nothing?”

– Joel Pett, cartoonist

# COMMUNICATE, COMMUNICATE, COMMUNICATE

In many ways this book is a direct response to the communication challenge the climate crisis poses. Covid-19 got our attention because of the immediacy of its threat. Yet the dangers posed by climate change are equally real and scary.

We would invoke the opposite of *Fight Club*'s first and only rule: *Talk about it*. Talk about it to anyone and everyone who will listen – or as many as your energy reserves will allow. Engage with it as much as possible. Get involved. See it, feel it, touch it.

There are some caveats. Remember who matters; and don't consider it a personal failure if you can't convince them. Stay positive and don't panic. Be demanding of people, companies and governments who don't live up to your expectations and your understanding of what is right. But also empathise. There are two sides to every story and creating in/out groups that divide will only hamper overall progress.

Cognitive behavioural therapists understand the importance of the exact words we use. Precision matters and we should take great care in the language we choose. The editorial guidelines of many major global media organisations have recently changed to reflect this. *Climate crisis* and *climate emergency* have been added to the lexicon and using these phrases, where appropriate, is actively encouraged. They convey a better sense of the reality of the situation. However, to use them exclusively without due care would be hyperbolic, devalue the expressions and risk creating panic, fear and paralysis.

Be visual – in the language and metaphors you use, but also literally. No polar bears, as such images suggest climate change is remote from everyday human concerns. Use real people and just plain good design. The climate reporting

desks of the major media outlets have already embraced this way of thinking.

It is important that people know this is happening, and not just in far-flung places. Extreme weather is affecting our daily lives and will come with a hefty price tag if we don't move to prevent, adapt, mitigate and rebuild. The short-term financial costs we dodge now will only come back to bite us later on. Public choice theory, i.e. the impermanence of electoral cycles, has a lot to answer for when it comes to bipartisan issues.

Using data and being creative with how we disseminate and visualise it will also be key. Allowing people real-time access to climate change indicators, variables, events and stories will help spread the message – aiding response times, empathy and support, as well as policy decisions.

When we find ourselves in unfamiliar territory words can often fail us. We might, therefore, need to find some new ones. Academics Matthew Schneider-Mayerson and Brent Ryan Bellamy certainly think our emerging reality requires a new language. Many Scandinavian countries, for example, have well over 50 words for what most of us simply know as snow. In these countries, people's livelihoods depend on them knowing the exact type.

Inevitably then, we will start to find and invent new words to help us describe and relate to the situation we all find ourselves in. Philosopher Glenn Albrecht created the word *solastalgia* to describe the pain or distress caused by the loss of a comforting place.

Fotminne

“Foot memory”(Swedish)

Ghurba

A kind of melancholic longing for home (Arabic)

Qi

A kind of all-governing, equilibrium-seeking, life-force energy (Chinese)

Godhuli

“Twilight” but also “the fleeting moments that immediately follow sunset”, representing transition, a state of in-betweenness (Bengali)

Dugnad

Unpaid voluntary, orchestrated community work (Norwegian)



## BORROWING WORDS

# PERSUASION AND INCENTIVES

Policymakers essentially have three tools at their disposal for creating the outcomes they seek: persuasion, incentives and compulsion.

Much of the rest of this chapter will try and tease out more insight into each. The order in which we have presented them is deliberate, as it reflects the most effective order in which to try them.

Ogilvy advertising guru Rory Sutherland argues persuasion is chronically underused in policy circles. It is cheap and effective: if you have good reason not to be persuaded, you can ignore it.

He cites the use of washing machines late at night, which can help reduce carbon emissions. Legislation and price incentives can be too blunt; many people have good reason not to put their appliances on late at night. They might work night shifts, or they might live in an apartment block. Mandating washing machines can only be used at certain times, or raising prices for energy consumption during the day, would therefore unfairly penalise a proportion of society. Persuasion on the other hand, can avoid these downsides.

Certain situations call for more direct intervention. Data scientist and best-selling author Alex ‘Sandy’ Pentland uses the example of the Red Balloon Challenge in the US to show us the power of incentives.

The 2009 DARPA Network Challenge offered \$40,000 to the first team to locate ten red balloons placed around the United States. The contest was announced approximately one month before the date the balloons were released and the official timer started. Despite only hearing about the challenge a few days before the balloons were deployed, Pentland’s research team won. They employed a unique strategy that effectively crowd-sourced intelligence by offering monetary rewards to those who gave them accurate information. On the proviso that they won, they offered \$4,000 in prize money for each balloon – with \$2,000 promised to the first person who sent in the correct coordinates, \$1,000 to whoever invited that balloon finder on to the team, \$500 to whoever invited the inviter and so on.

This social incentive and recruiter scheme was so powerful that Pentland and his team solved the challenge in less than nine hours, beating over 4,000 competitors – most of whom had started preparations far earlier.

While there is a place for all three tools (as we shall see in the pages that follow), using persuasion would be far cheaper than creating incentives, both of the carrot and the stick variety. We should not forget this.

**“I always argue  
that persuasion is the one  
you should try first;  
then incentives, and  
then compulsion.”**

**— Rory Sutherland,  
advertising guru**



# A TAXING ISSUE

## CARBON PRICES, TARIFFS AND LEAKAGE

If all else fails, tax it.

Some problems require more drastic intervention than mere persuasion and price incentives. We have long since reached that juncture with carbon. The failure of polluters to pay for the true costs of their carbon emissions combine the bystander, free-rider and tragedy of the commons issues into one gigantic market failure.

Interestingly, climate change has achieved something few would have ever thought possible: widespread agreement among economists. Over 3,500 US economists, including 28 Nobel Laureates and four former chairs of the Federal Reserve, from across the political and academic spectrum have signed the *Statement on Carbon Dividends* which calls for a tax on carbon emissions that increases every year. The economists conclude that a carbon tax would be cost-effective and efficient and the annual increases could drive long-term investment while avoiding near-term economic disruption.

They also stress the importance of a border-adjustment mechanism and a focus on the consumption of carbon, not just its production. As economist Dieter Helm says: *“What is the point in cutting emissions if you are going to import stuff from China and other countries that are increasing their pollution the fastest?”*

There’s that mental accounting problem again. Making these carbon adjustments at the border needn’t be fantastically complicated, either. Start with the areas of highest impact: steel, cement, aluminium, fertiliser and petrochemicals.

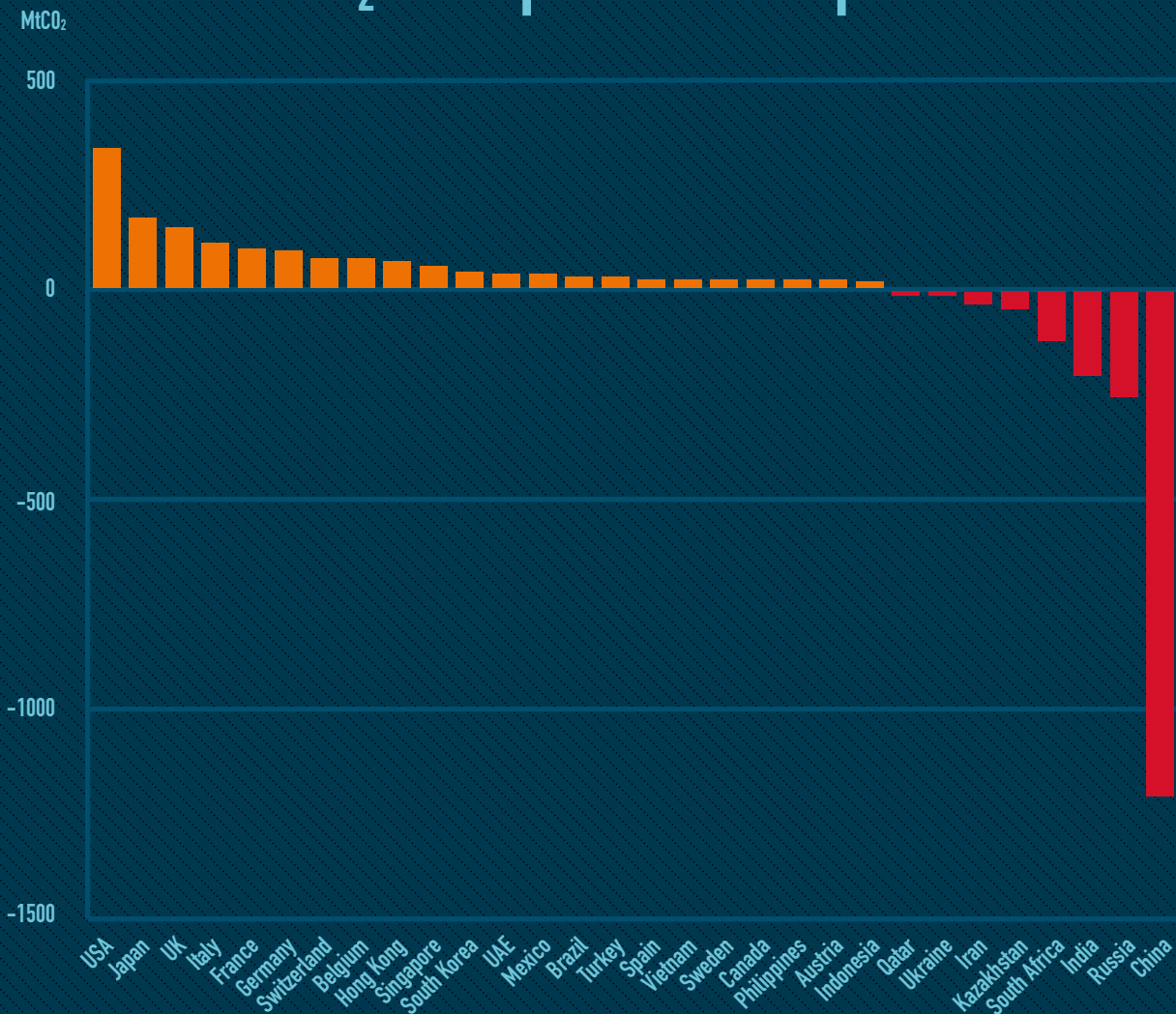
As the air and oceans know no borders, there is a strong case for multilateralism. Water and particles drift and seep around the globe, providing a common resource without reference or allegiance to tribes. Efforts from one country will be futile if others don’t fall into line, and by ensuring any carbon tax focuses on consumption, the incentive structure can be properly aligned, avoiding carbon leakage across borders.

Whether at the individual or the country level, *it’s the consumer, stupid!*

However, in recognition of the difficulty involved in achieving a 198-way agreement between UN counties, it might make sense for the G7 to agree a carbon-pricing floor and, in effect, form a club that sets the example for the rest of the world to follow.

And given that nobody likes paying taxes, perhaps the issue should be framed differently. In the UK, we have all become accustomed to paying National Insurance to help notionally fund the National Health Service. Maybe a form of ‘Climate Insurance’ would be more palatable and effective.

## CO<sub>2</sub> of imports and exports



Note: Total net CO<sub>2</sub> transfers associated with trade.  
Source: Carbon Brief (based on data from the Global Carbon Project). 2014



# BEHAVIOURAL WILDFIRE

## THE POWER OF PEER PRESSURE

The logic of behavioural contagion runs both ways.

A key premise of this book is that we vastly underestimate the influence others have on our behaviour. And even if we do understand this on some intuitive level, we certainly don't translate the insight into astute policies. This is a wasted opportunity.

Again, Rory Sutherland offers up a useful parable. He explains that in Prussia, in the nineteenth century, the exchequer was grappling with how to fund the war effort against France. Princess Marianne asked wealthy and aristocratic women to donate their gold ornaments. In return, they were given iron replicas with the words "Gold gab ich für Eisen", ("I gave gold for iron") inscribed. From then on, the social status associated with wearing and displaying the iron jewellery was far greater than wearing gold itself.

Economist Robert Frank points out how behavioural cascades can affect societal views and norms. Anonymous surveys from Roper Center, PollingReport.com and General Social Survey showed over 70 per cent of the US population opposed same-sex marriage in 1988, and that by 2015 the proportion had fallen to well under 40 per cent. Frank argues that a large part of this dramatic reversal was down to notable figures going on record in public and stating their support, along with their personal reasons why.

Studies of Google Maps show that solar panels tend to be clustered on the roofs of neighbouring houses. It seems likely that this contagion effect also extends to other key areas of our climate consumption habits – like more mindful grocery shopping. It will be interesting to see what comes of Flygskam, the flight-shaming movement triggered in Sweden.

Frank's key message is that our behaviours are contagious, and they can ricochet and spiral in either good or bad directions. The ice bucket challenge, used in this chapter's mirror (*Behavioural wildfire: The dangers of peer pressure*), is ultimately an example of promoting good socially influenced behaviour, just with a small caveat. While the challenge's charitable ends were pure, our criticism is over the agency and consciousness of the allocation of resources.

Pointing out that our behaviour is heavily influenced by others is such an obvious point it seems silly to even write it down. But simple ideas and concepts so often get left behind in favour of complex ones – somehow the latter feel more impressive and robust.

This is why controversial CEO Elon Musk's Tesla is so fascinating. He has created a luxury and desirable good in the form of his electric cars. The hope is that owning one will become a badge of climate honour as well as a signal of wealth – just like giving gold for iron.

"Let me ask the man who could maintain this position most stiffly, what compensation he will accept to go to church some Sunday and sit during the sermon with his wife's bonnet upon his head? Not a trifle, I'll venture. And why not? ... Is it not because there would be something egregiously unfashionable in it? Then it is the influence of fashion; and what is the influence of fashion, but the influence that other people's actions have [on our own] actions, the strong inclination each of us feels to do as we see all our neighbors do"

– Abraham Lincoln,

Springfield Washington Temperance Society, Illinois, 1842



# GREEN BY DEFAULT

In his book *Conformity*, best-selling author and lawyer Cass Sunstein reminds us of the power of using default choices to engineer environmentally friendly outcomes. A couple of natural experiments in Germany help to make his point.

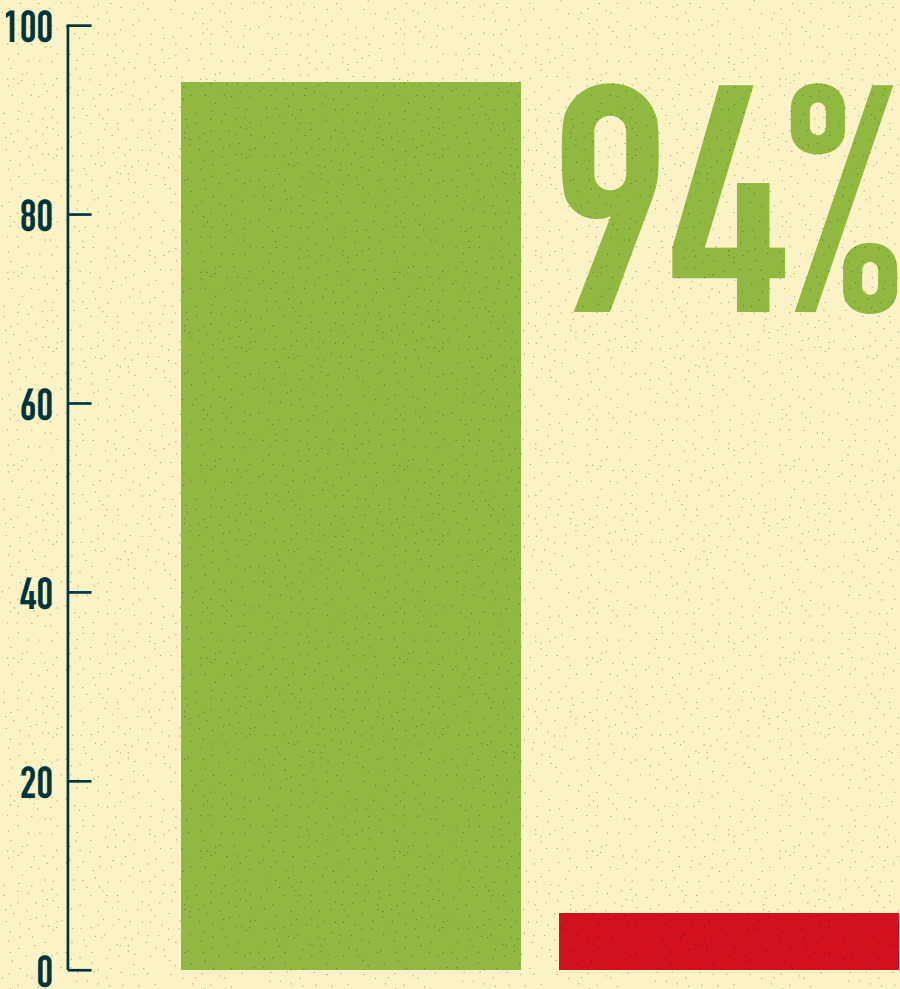
In the aftermath of the Chernobyl disaster in 1986, the conservative-dominated community of Schönauf, in the Black Forest, formed a cooperative renewable energy company called the Schönauf Power Company. Customers were automatically placed with the local provider and could opt to find an alternative, yet almost no one did (the opt-out rate was only slightly above zero).

An energy supplier in southern Germany, Energiedienst GmbH, provides the second example. The company created three separate tariffs in 1999. The default choice was green, and was eight per cent cheaper than the old one. The other two options were one that was greener but more expensive, and one that was less green but cheaper. Illustrating the inertia of human nature, approximately 94 per cent of customers remained on the default tariff, with only 4.3 per cent switching to the cheaper, dirtier one. The rest either switched to the greener alternative or to a different supplier.

These results provide enormous hope. Achieving them in a politically conservative environment is a pretty strong litmus test.

Similar green defaults, like double-sided printing in organisations, have been proven to make significant environmental and monetary savings. There will be many other situations where this logic can be used for good. Indeed, around 95 per cent of people stay in the default pension they are offered at work, and investments made by these pension funds have been driving the climate emergency. So why not make the default a pension that tackles, not causes the climate emergency? Leading pension funds are doing so, by offering default pensions that will reduce emissions to net zero in the coming years.

All ideas welcome.



Source: The Ethics of Influence: 'Green by Default? Ethical Challenges for Environmental Protection', Cass R. Sunstein. 2016

# ENGINEERING CHANGE

## HARNESSING THE POWER OF DESIGN

If you stand outside the Design Museum in London you will come face-to-face with an inspiring quote. It relates to engineering and design.

Engineers and designers can help nudge us in the right direction. Simple design principles and measures can have an outsized impact in creating better, more optimal outcomes.

Let's run a couple of thought experiments. What does the design of a washing-machine button have to do with climate change? Or even the brand messaging on washing detergent?

It shouldn't take too much logic to establish the link between the temperature you wash your clothes at and the amount of energy it uses. Where button design comes in is that there is a psychological decision process that happens regarding the temperature level you choose, and the design options can influence it. Everyone wants clean clothes. But achieving that cleanliness involves a trade-off between the temperature you wash at, the effectiveness of your detergent and the amount you use in proportion to the size of the load.

The way the options on the temperature dial are presented significantly affects what we decide. Our choice architecture, to use the behavioural psychology vernacular, influences what we choose. Clump all the temperature options closely together and people drift towards higher temperature options (like 50 or 60 degrees Celsius). However, put 30 and 40 near each other and leave a gap for the higher temperatures and most people simply opt for 40.

Similarly, the branding and communication surrounding the strength of our washing powder will influence both how much we use and, potentially, the temperature we choose to wash at.

The charging infrastructure for electric cars is another case in point. In Norway, electric parking bays are prioritised over non-electric in car parks and service stations. This does two things. It makes owning an electric car feel like a social norm and also plays to our preference for convenience.

Slightly playfully, behavioural economists Richard Thaler and Cass Sunstein bemoan the suboptimal design of TV remote controls, arguing the input button is far too big relative to the amount it gets used. There must be hundreds of other examples whereby simple design interventions could reduce our carbon footprint. When cumulated, design solutions can have a significant effect.

For those still wondering, the sign outside the Design Museum says, "*Design. Humanity's best friend*". It is very hard to argue with.

**"Science can amuse  
and fascinate us all,  
but it is engineering  
that changes the world."**

**– Isaac Asimov, American writer,  
professor of biochemistry**

# LABELS AND TABLES

## VISUAL CUES AND A HEALTHY RACE TO THE TOP

Labels matter.

The brain processes visual information up to 60,000 times faster than it does written language. As so much of our decision-making lies submerged below the conscious level, creating the right visual signposts for carbon-friendly products is essential to help reduce the impact of our consumer choices.

As far back as 2008, Richard Thaler and Cass Sunstein highlighted this in their groundbreaking book *Nudge*. Recognising that the feedback mechanism between our actions and their effect on the planet is faulty, they suggested a Greenhouse Gas Inventory be created. Their hunch was that public disclosures are necessary to create healthy feedback loops between corporate and individual behaviour.

Modelled on the Toxic Release Inventory (part of the Emergency Planning and Community Right to Know Act in the US in 1986), it would act as public bookkeeping service for greenhouse gas emitters. Naming and shaming companies creates substantial incentives for companies to correct their behaviour and, along with prominent labelling, could provide consumers with simple signposts to guide their purchasing behaviour.

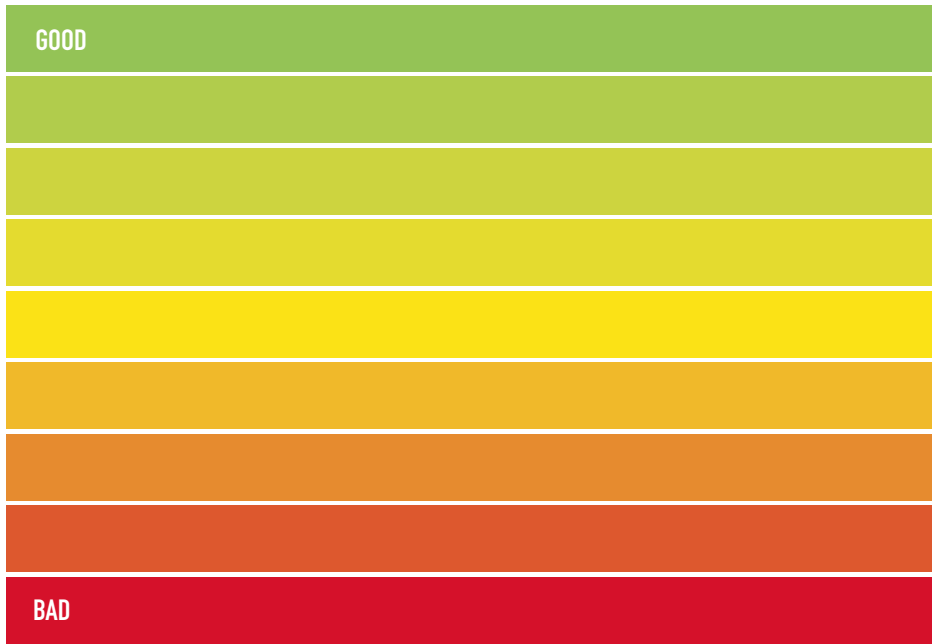
The Fairtrade movement is a classic example of where labelling like this has worked. Fuel efficiency stickers on cars are another example Thaler and Sunstein cite. Combining competition-driven incentives and the power of social virtue-signalling, the idea has intriguing potential – particularly in an app-based, digital world.

Taking these examples and principles as a template for climate change, and rolling them out across all relevant industries, including finance, makes complete sense. The Task Force on Climate-related Financial Disclosures will help improve corporate disclosures and should become mandatory. It should, however, seek to be more ambitious and ensure that firms’ accounting measures internalise the externality that is climate change and properly account for the risks associated with it.

Of course, there will be complications. Carbon and sustainability measurements will sometimes amount to judgement calls; they will contain elements of subjectivity. Crude black-and-white distinctions will leave room for error, manipulation and corruption. They may not capture direction of travel either, i.e. those companies, and by association products, on the road to improvement.

Psychologists would tend to agree. In his book *Why Aren’t We Saving The Planet*, Geoffrey Beattie flags the importance of labels as visual cues for better climate decision-making. It would be wise to listen to him.

## THE BRAIN PROCESSES VISUAL INFORMATION UP TO 60,000 TIMES FASTER THAN IT DOES WRITTEN LANGUAGE



# THE PEN IS MIGHTIER THAN THE SWORD

Numerous successful examples of behavioural nudges exist and the results can be impressive, particularly when viewed through a cost-benefit analysis; techniques can be as subtle (and therefore cheap) as changing a few words on a letter.

A consistent influencing factor when crafting nudge communications consistently is peer pressure. Messages like “Help us save the planet by reusing your towel”, while providing a small positive impact, do not typically perform as well as “Join your fellow guests in helping to save the planet and reuse your towel”.

Similar findings apply to domestic energy consumption and tax collection. Academics have dubbed this phenomenon *conditional cooperation*.

In what he calls alchemy, our advertising friend Rory Sutherland gives examples of entire markets being created by using a change in language to reimagine (or rather rebrand) something. For example, by changing the name of the Cornish pilchard to its distant relative, the sardine, Nick Howell of the Pilchard Works fish supplier in Newlyn, Cornwall, saved a dying market.

A report in the *Daily Telegraph* in 2012 suggested that a large chunk of the resulting 180 per cent increase in Tesco sardine sales was attributable to the sale of Cornish sardines. A similar thing happened with Chilean seabass (formerly known as the Patagonian toothfish).

Such is the power of language. If we can continue to find simple ways of nudging our behaviour towards a more sustainable footing, then it needn't cost a fortune. Perhaps climate change needs a Global Nudge Unit, much like the Behavioural Insights Team the UK government set up in 2010.

**“Including the sentence  
‘9 out of 10 people pay their tax on time’  
in UK government tax reminder letters brought  
forward £200 million in late tax payments.”**

**— UK Behavioural Insights Team**



# FLATTENING THE CLIMATE CURVE

Few of us had ever heard the term ‘flattening the curve’ prior to the recent coronavirus outbreak. Fewer still understood the devastating combination of exponential growth and pandemic virality. The learnings from this crash course in risk management should be applied to our climate thinking.

Comprehending, let alone measuring, the human grief and suffering caused by Covid-19 will be impossible. The effects will be felt for generations to come.

However, if it jolts enough of us into realising how interconnected our lives, societies and the Earth as a whole really are then perhaps some glimmer of positivity can be taken from it. Global food systems, urbanisation, deforestation, population growth, international travel and commerce are inextricably linked. Together, they combine to inflict damage on wildlife and reduce the resilience of our ecosystems. It was this melting pot that allowed a deadly infectious disease to break out. Yet many of the same links that left us vulnerable to a global pandemic are causing a build-up of risk in the Earth’s climate system.

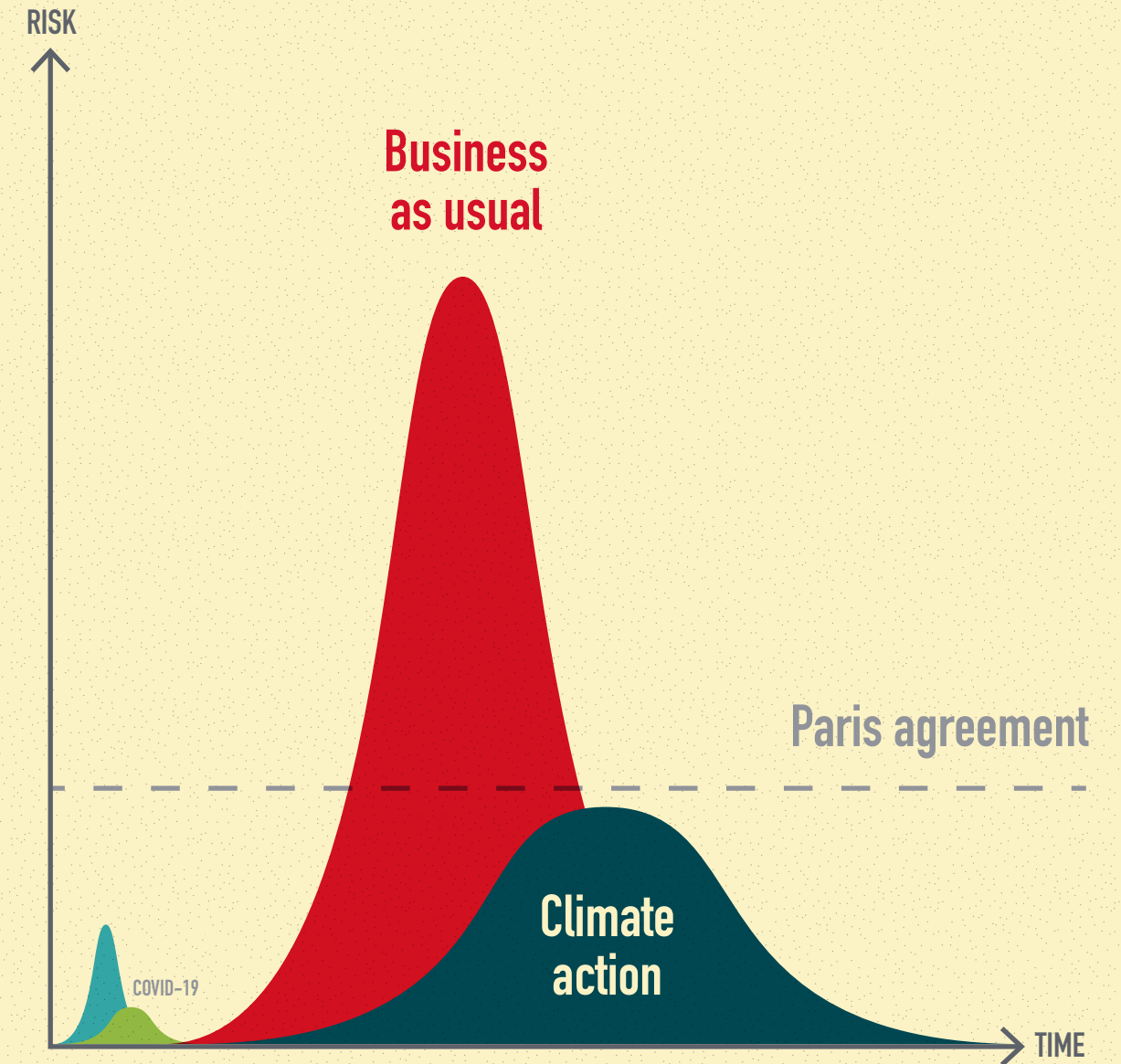
Writing in the *Financial Times*, novelist Arundhati Roy described the pandemic as a portal, reminding us that outbreaks have historically forced us to break with the past and imagine the world anew. Referring to capitalism, she pleaded that we use the situation as “*a chance to rethink the doomsday machine we have built for ourselves*”.

While this assessment is harsh, it is clear that our economic system needs an overhaul. As Jason Hickel joked on Twitter: “*Capitalism has proliferated 34 varieties of Pringles, 40 different barbies, and ballistic missiles with a range of 16,000 kilometres, but for some reason we cannot produce enough masks and ventilators for basic public health.*”

Armed with a greater understanding of the implications of globalisation and its web of interconnections, as well as a recognition of our repeated, complacent failure to spot and manage the associated risks, we could carve something socially useful out of a global catastrophe.

Pathogenic microbes and CO<sub>2</sub> molecules don’t wield to reason, they merely follow the natural laws of biology and physics. Creating a world with cleaner air and water, stronger social structures with less inequality, a redefined and more inclusive corporate culture and resilient global supply chains, is up to us. Such a project requires a recognition that we are global citizens. Build back better, as we have been repeatedly promised.

Perhaps by unveiling the dirtier aspects of our behaviour and social fabric we can glimpse through Roy’s portal and see that it really is time to flatten the giant climate curve on the horizon.





# LESSONS FROM PARETO

Italian economist and philosopher Vilfredo Pareto knew a thing or two about prioritisation. His 80/20 rule, the law of the vital few, states that 80 per cent of results come from 20 per cent of efforts. Its simplicity is beguiling. Its potential uses in the climate fight, manifold.

Take carbon emissions plotted by the amount of income we earn. Oxfam’s chart opposite clearly shows who are the worst offenders and provides a clear place to focus our efforts and attention.

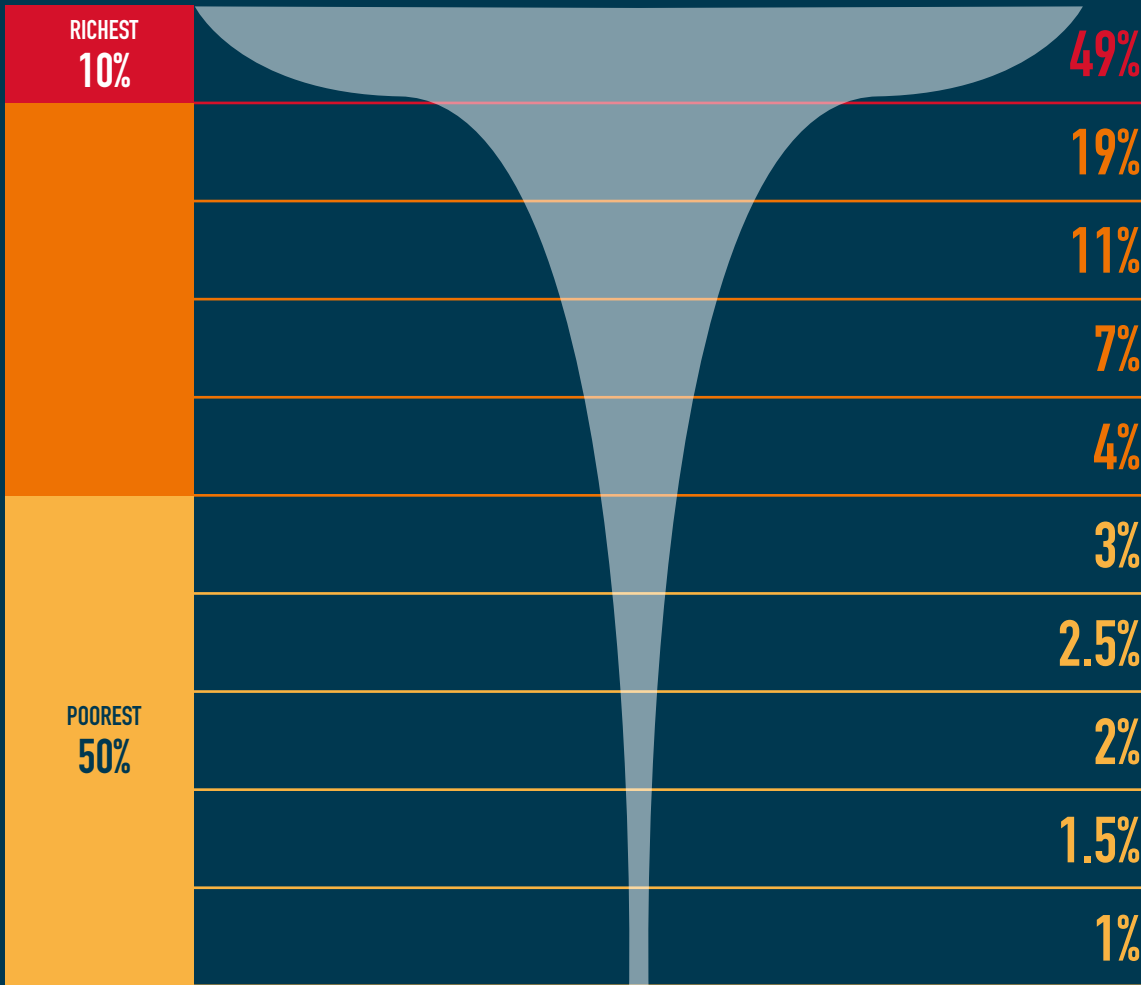
Similar logic can be applied to our food consumption choices. Beef has by far and away the biggest carbon footprint – although it should be noted that the impact can vary depending on how it was sourced (according to research by Poore & Nemecek in *Science*, 2018). Other offenders are lamb, farmed prawns and chocolate. Focusing your diet on vegetables, as well as sustainable and locally sourced food, reduces your carbon footprint.

Plotting emissions by country is also revealing. Pareto would focus his attention on the US, China and India, which together account for nearly 50 per cent of the world’s CO<sub>2</sub> emissions (based on 2017 data). While that shouldn’t give all other nations a free-rider pass, it should help focus multilateral conversations.

Viewing industries and sectors in this way is helping policymakers, too. It is also why the “common but differentiated responsibilities” currently being proposed through the major climate negotiations are so important.

Pareto’s logic can be applied to any problem, however large or small, and can help overcome the burden of cognitive overload – providing a much clearer path for where to concentrate our attention.

RICHEST 10% RESPONSIBLE FOR ALMOST HALF OF TOTAL LIFESTYLE CONSUMPTION EMISSIONS



POOREST 50% RESPONSIBLE FOR ONLY AROUND 10% OF TOTAL LIFESTYLE CONSUMPTION EMISSIONS

Source: Oxfam, 2015

05

THE  
MIND IS  
THE LIMIT





**“The impossible often has a kind of integrity to it  
which the merely improbable lacks.”**

— Douglas Adams, *The Hitchhiker’s Guide to the Galaxy*

## DREAMING BIG AND CHALLENGING ASSUMPTIONS

The planet has immovable boundaries and limits; our minds don’t. Psychology professor Carol Dweck identified a while ago that people can be (broadly) split into two mindsets: fixed and growth. Some people believe their character, talents and abilities are all set in stone. Others – those with a growth mindset – are the opposite and see themselves as a work-in-progress and therefore malleable.

This, albeit crude, distinction is important because it helps us see the climate challenge from a different vantage point. People with fixed mindsets are unlikely to believe they can influence the avoidance of a climate disaster. People with a growth mindset, on the other hand, are likely to enjoy the process of learning, have an open mind, listen to feedback, and work hard to improve. They are also more likely to daydream about future possibilities and accept the fact they might be wrong.

*“Imagination is more important than knowledge.  
For knowledge is limited, whereas imagination embraces the  
entire world, stimulating progress, giving birth to evolution.”*  
– Albert Einstein.

Few thinkers are as inspiring as Einstein. It feels fitting to evoke his wisdom to help us over the next psychological climate hurdle. Much of what you have read so far has focused on you: on your brain and the tricks it can play – offering some guiding principles and inspiration for fighting back against the tide of cognitive treacle you must wade through.

It is natural that any attempt to solve climate change should start at the micro, individual level – for it is here we have the most control. Though not completely departing from the journey of personal responsibility and the inner-workings of your head, if we are to really tackle climate change some pretty big ideas are needed, and quickly.

We all have a responsibility to entertain and engage with lofty, creative, ambitious and sometimes even wacky ideas. For some, painfully aware that our spheres of influence vary, this may seem futile. Few of us are going to invent a ground-breaking new piece of climate technology or pass a law that could help change the course of history. But we might. Failing that, as climate change continues to form a key part of the political agenda, it will be incumbent upon us to be educated and use our informed voices and votes wisely.

Thankfully, and not surprisingly given the severity of the issue, many brilliant minds have been thinking about climate change for some time. Here we have tried to collate the most promising and ambitious ones. In the spirit of the rest of this book, grappling with these issues will be challenging; not all of them are intuitive. Previously held assumptions may come under attack – like the role of the state or of nuclear energy.

Tired, old, and habitual mindsets are rarely fertile ground for making great practical or intellectual leaps forward. So wander off into the next chapter with an open mind, a dose of humility and with your imagination at the ready.

# THE NUCLEAR OPTION

Whenever a reaction to something is so strong, it usually pays to dig a little deeper and understand what is really going on. Our emotional reactions to nuclear energy warrant further attention. The chart opposite proves this; it shows just how bad we are at assessing risk, particularly when emotions get in the way.

What is special about nuclear energy, and which has therefore triggered such a visceral response to the powerful technology, is the high-profile manner in which rare incidents have occurred. Instead of a literal death by eight hundred thousand cuts (as with coal per year) – none of which provoke any media attention on their own – a nuclear power-plant accident captures headlines and imaginations, and vividly so.

Meta-analysis by Our World in Data found that the estimated number of deaths from the Chernobyl disaster ranges from 4,000 to 60,000 – and this includes the accident itself, radiation exposure and psychological stress. What is more, in part thanks to the openness and swiftness of the Japanese authorities’ response, the more recent Fukushima disaster is thought to have been far less deadly. So although the exact statistics can be debated, the broader point cannot be: nuclear energy is infinitely less harmful than coal or oil.

It is a bit like driving to the airport and worrying about the flight. Any statistician will tell you that your nonchalance during the journey to the airport is misguided, as you are far more likely to be killed in a car accident than while 30,000 feet above solid ground. Our emotions, however, get in the way of objectivity.

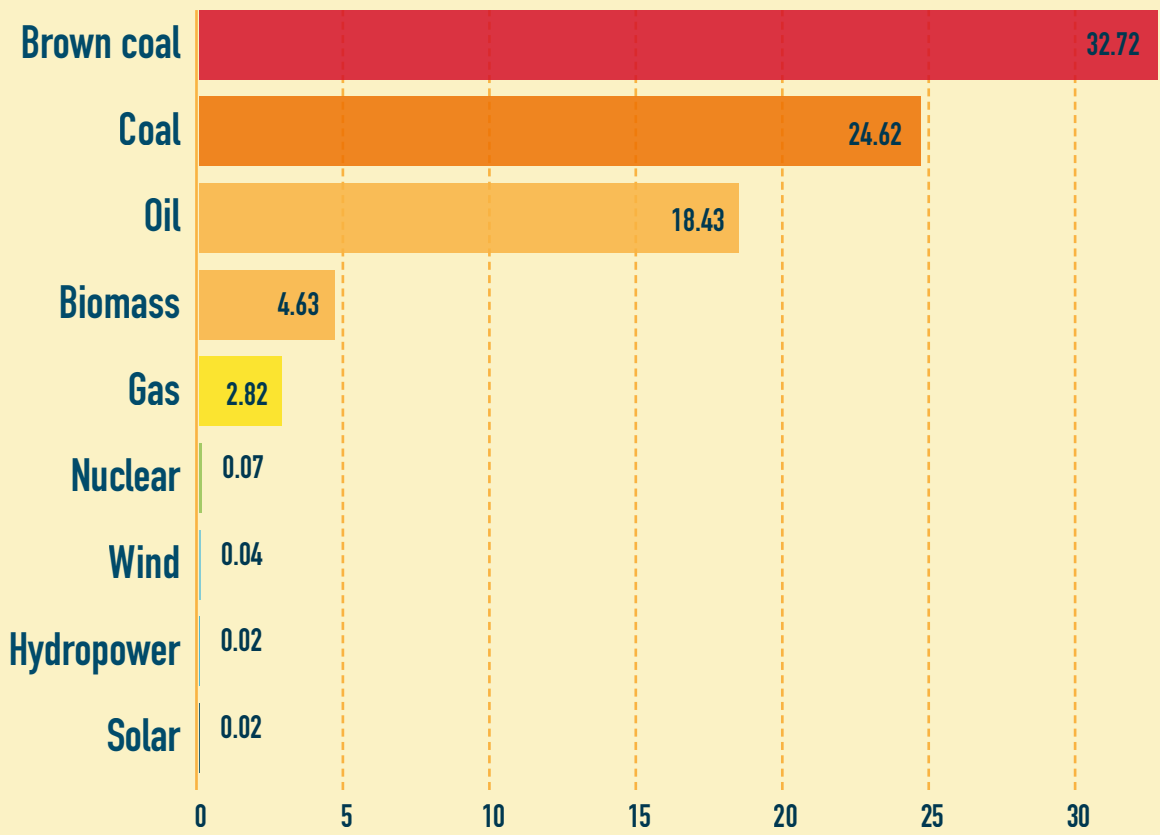
The consequences of this risk-blindness to our clean-energy transition are huge. The cost of lost opportunities alone is incalculable. For starters, let’s take the lack of funding for research and development to improve the technology and explore ways of overcoming its safety risks and shortfalls – including dealing with waste. Incredibly, the designs for Chernobyl were drawn up with a pencil and ruler in the 1940s and built with 1950s technology. Most active nuclear power plants were designed and built in the 1960s and 1970s. Just think what some focused innovation and scientific brainpower could achieve.

Energy experts and nuclear pioneers Edward Teller and Lowell Wood are well aware of this. They argue that using depleted uranium is much safer than enriched uranium as it can’t be used for nuclear weapons. If this line of scientific thinking is pursued (something the Gates Foundation and TerraPower are trying to do), a massive political impediment to nuclear forming part of the overall clean-energy solution could be overcome.

Given the number of nuclear power plants already in existence and lying dormant, this form of energy should at least be considered as part of any optimal future energy mix. Many of the same arguments apply to hydrogen.

## Death rates from energy production per TWh

DEATH RATES ARE MEASURED BASED ON DEATHS FROM ACCIDENTS AND AIR POLLUTION PER TERA-WATT-HOUR (TWH).



Source: Markandya & Wilkinson (2007); Sovacool et al. (2016)

# BABY BOOMERS, YOUR PLANET NEEDS YOU!

All across the developed world we are witnessing a mass exodus from our workforces. As large swathes of employees approach retirement and ready themselves for lives of leisure, a seismic demographic shift is rippling through rich-world societies. And, in the process, we are losing the power of our fastest-growing natural resource: retired baby boomers.

This matters in the climate fight because to be successful we will need all of our wit and wisdom about us.

Economists and business experts Andrew Scott and Lynda Gratton vividly sketch out some interesting trends in their groundbreaking book, *The 100 Year Life*. They argue the traditional rigidity of a linear three-stage life ('get educated, go to work, retire') is giving way to a far more fluid and dynamic multi-stage one. The previously distinct phases now all blur and intersect.

One of the exciting consequences of this trend is the adoption of more purpose-driven latter-stage lifestyle choices. Gratton and Scott were heavily influenced by Marc Freedman, author of *Encore*. Freedman identified that the US had reached 'peak retirement' in the mid-1980s and highlighted cases where individuals were enjoying what Freedman dubbed an 'encore career'. These ranged wildly from social entrepreneurship to becoming a shop assistant.

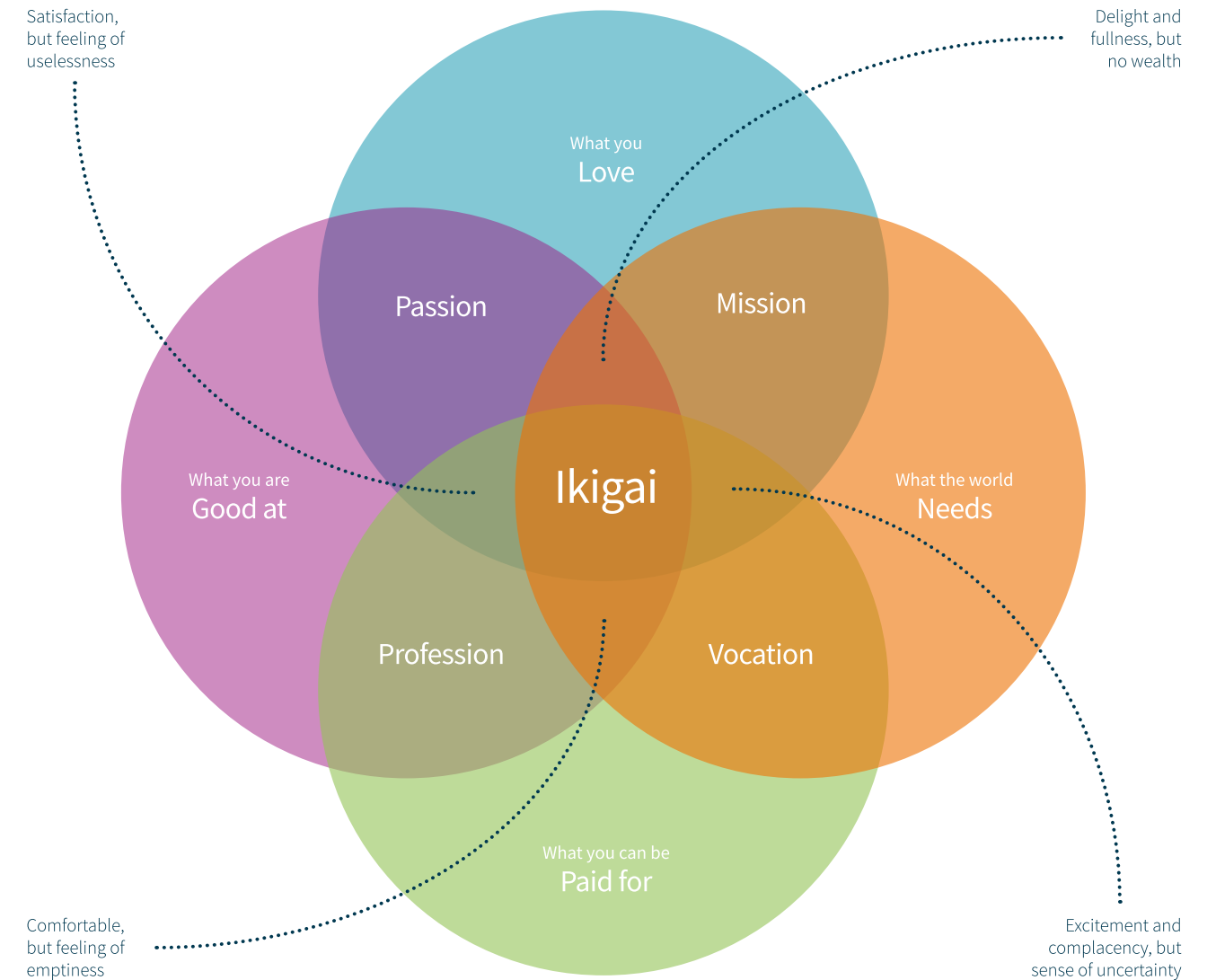
While the ambitions of the former may seem grander, the simplicity of seeking greater social interactions, performing a key role in society and accepting the inevitable cognitive erosion that comes with age make the latter appealing too. However, many cultural mindsets will need to be broken down and challenged – ageism in the workplace being a prime example.

Harnessing the power of the baby boomer generation does not just have to revolve around paid and unpaid employment opportunities, though.

Climate scientist Ed Hawkins, of Warming Stripes fame, provides just one example of the type of activity baby boomers could embrace. Large chunks of useful weather-related observations and data points are hidden away in analogue, hand-written records unable to be accessed and modelled by climate experts. To help rectify this, Hawkins helped promote Zooniverse through social media, which is a platform that encourages people-powered research. By enlisting volunteers to help plug the missing data gaps, it allows science to continue its endless quest for progress. Perhaps recently retired baby boomers with new-found time on their hands could think seriously about these types of projects.

Of course, everyone's circumstances, personalities, hopes, desires, stress levels, abilities and so on will be different. The concept of 'more work' will clearly not appeal to everyone. Yet, for those that recognise the mental and physical benefits of staying active and embracing purpose, there are literally limitless win-win situations just waiting to be uncovered or invented.

Unleashing the latent potential within a cohort of society that is rapidly growing could help not only individuals and society, but also the planet.



# DEVELOPED MARKET HYPOCRISY

In the race to decarbonise there is a real risk that the concept of a ‘just’ transition gets lost. Putting tribalism to one side, the tension between environmental concerns and social ones will inevitably come into conflict as we attempt to make the necessary adjustments.

As we do so, one thing to bear in mind is the disproportionate amount of carbon the developed world has emitted since the Industrial Revolution. It is a staggering fact that over 50 per cent of total industrial carbon emission has occurred since 1990, the vast majority of which has flowed from the economic bellies of developed countries. Our drastic increases in living standards and (relatively) stable social structures have been built on a foundation of energy-guzzling habits.

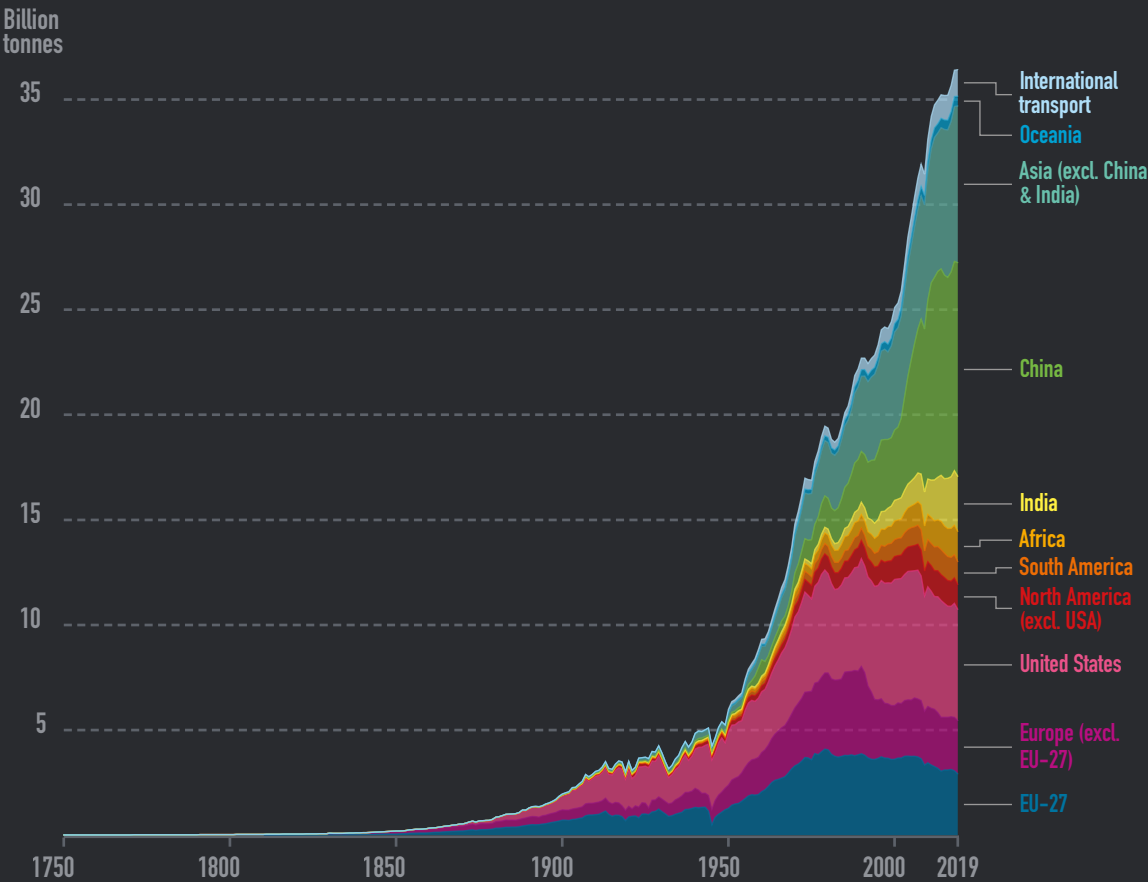
To deny our developing neighbours a similar opportunity would be wrong-headed and unfair. In an ideal world, they will simply ‘leapfrog’ to green, clean and renewable energy sources. The reality is likely to be far more complex.

This moral imperative comes into greater focus when you consider that poorer countries are typically the ones most exposed to the ravages of climate change. Think of Bangladesh and its flood plains. Think of Pakistan and its heatwaves. Think of the Caribbean and hurricanes. Think of Brazil and the Amazon wildfires. The majority of these financial losses are also uninsured, further exacerbating the issue.

Michael Schellenberger, a well-known author and nuclear advocate, argues the moral obligation to use clean energy should fall on rich countries. As developing countries try to mature their economies and lift themselves out of poverty, should we really be lecturing them on green energy usage? (Though given their size, China and India might warrant partial exception.)

Demanding a complete, worldwide ban on fossil-fuel use is hypocritical. Many countries whose absolute carbon footprints are small have far bigger things to worry about.

## Annual total CO<sub>2</sub> emissions, by world region



Note: This measures CO<sub>2</sub> emissions from fossil fuels and cement production only – land use change is not included.  
Source: Our World in Data based on Global carbon Project data  
‘Statistical differences’(included in the GCP dataset) are not included here.

# RIPPLES AND HALOS

## THE POSITIVE SPILLOVERS OF DECARBONISING SUPPLY CHAINS

The webs of commercial value chains that run across industries and geographies are potential catalysts for major change.

Indeed, a recent report from the Boston Consulting Group found that just eight supply chains are responsible for more than 50 per cent of global carbon emissions. (FYI – These are food, construction, fashion, FMGC, electronics, auto, professional services and other freight.)

In homage to their sheer influence, in his book *Connectography* global strategist Parag Khanna describes supply chains as “the original worldwide web, enveloping our world like a ball of yarn”. Pareto would clearly approve of focusing our attention here.

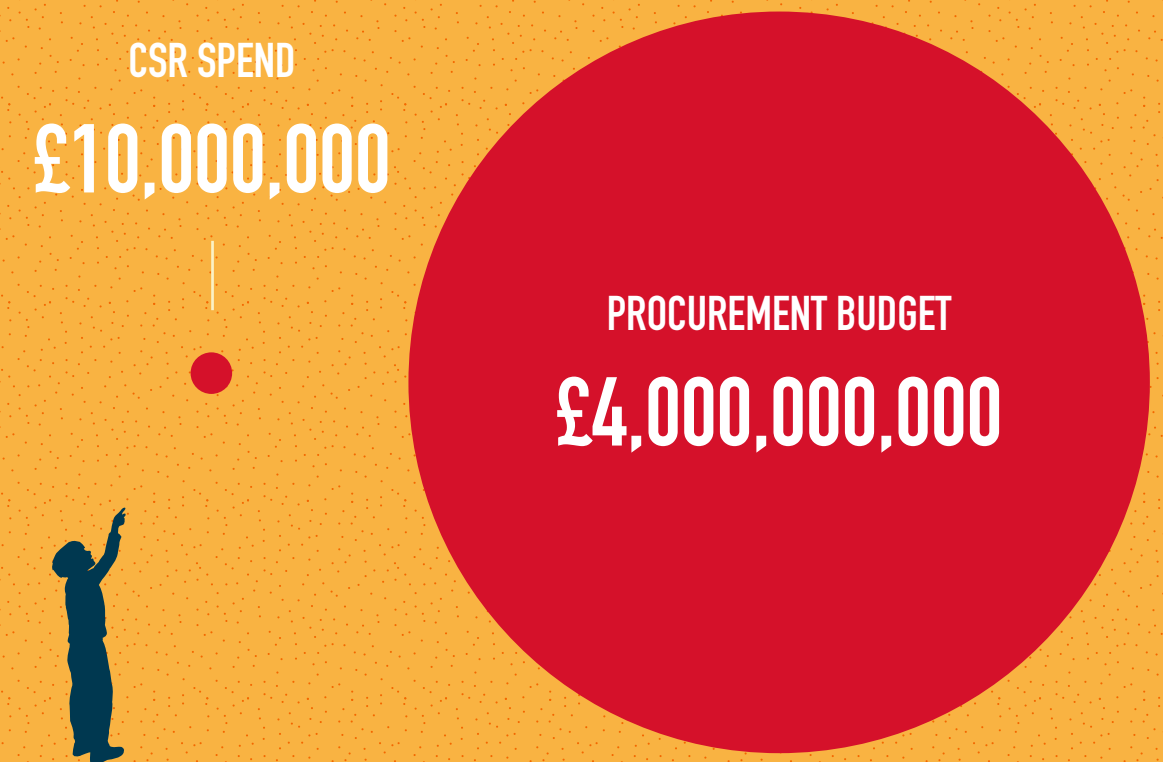
As we race to net zero, and with corporate pledges multiplying by the second, the knock-on impact of a serious commitment that extends beyond a company’s immediate (or direct) business activities is huge. Corporate emissions are labelled Scope one, two and three; the latter category is important here as it covers all indirect emissions that occur in a company’s value chain. Second-order pressure spills out from large, dominant corporate players to a wider, more diffuse supplier ecosystem.

For example, the recent wave of Big Tech commitments to carbon neutrality, or even carbon negativity in the case of Microsoft, will send encouraging ripples throughout their suppliers. Equally, a quick comparison of FTSE 100 companies’ procurement budget versus what they spend on corporate social responsibility efforts makes the point. The ratio is a staggering 400 to one.

Though originally coined by psychologist Edward Thorndike to describe the way commanding officers rated their soldiers, he surely wouldn’t mind us borrowing some of the *halo effect*’s principles to help highlight how companies can influence activity well beyond their own operations. This subtle reframing makes all the difference, revealing the hidden positivity and power lying dormant in commercial networks.

What is more, as the number of critical eyes assessing the climate transition grows, any greenwashing (the practice of exaggerating green credentials), will be quickly exposed. If companies really want obtain or keep their green halos, these commitments will need to be genuine.

## CSR spend vs procurement budget of average FTSE 100 company



# SEA CHANGE

## BLUE CARBON, ALGAE AND COASTAL ECOSYSTEMS

Let's start with some facts.

71 per cent of the Earth's surface is water and the ocean is an enormous carbon sink. According to the World Wide Fund for Nature, it is the world's largest store of carbon, with an estimated 83 per cent of the global carbon cycle circulated through marine waters. And while only home to 15 per cent of species, the ocean helps regulate the global climate by mediating temperature, driving weather and rainfall patterns (i.e. droughts and floods).

Global sea level rise, thanks to melting ice caps, is the most intuitive link between climate and the ocean. The interplay is key. As our glaciers shrink and run-off into the sea, we lose our most reflective surface: ice reflects light and heat, whereas water absorbs them. A warming ocean is a classic feedback loop, replete with its own tipping point.

However, there is another, less obvious link. Though far from a get-out clause, 'blue carbon' offers us all some hope. Climate charity Project Drawdown states that *"coastal wetlands can store five times as much carbon as tropical forests over the long term, mostly in deep wetland soils"*.

These coastal wetland ecosystems, found on every continent except Antarctica, are in decline and desperately need conservation and restoration efforts. And, just as on land – i.e. better management of farmland, peatland and woodland – we can build and repair crucial mangroves, tidal marshes and seagrass meadows. For that to happen, though, increased advocacy and research are essential.

Algae farms are another interesting carbon sequestration option. *"The trees might not save us—but the oceans could,"* stated an article in *Quartz* called *"Algae might be a secret weapon to combatting climate change"*. The same piece flagged some staggering statistics: *"Algae, when used in conjunction with AI-powered bioreactors, is up to 400 times more efficient than a tree at removing CO<sub>2</sub> from the atmosphere."* It is also thought to be a potential solution to any future food crisis, as algae oil can be sold as supplements and its protein and carbohydrates used in protein-based food products.

The World Wide Fund for Nature sums up the interconnections crudely: *"If we reach a tipping point, we will likely see more extreme weather events, changing ocean currents, rising sea levels and temperatures, and melting of sea ice and ice sheets – all of which aggravate the negative impacts of overfishing, illegal fishing, pollution, and habitat degradation."*

Ours truly is a *blue* planet. With less than seven per cent of our oceans currently protected, we should probably remember this as our *green-tinted* lenses take over.

# CRITICAL STORAGE

83%

GLOBAL CARBON

2%

COVERAGE

50%

SEDIMENT CARBON

# OCEAN + COASTAL HABITATS

83% of the global carbon cycle is circulated through the ocean. Coastal habitats cover less than 2% of the total ocean area, but account for approximately half of the total carbon sequestered in ocean sediments.



# DIVERSITY EQUALS RESILIENCE

## THINKING DIFFERENTLY CAN HELP SOLVE BIG PROBLEMS

Whichever way you look at resilience, you invariably end up back in the same place. Whether analysing cells, molecules, genes, thoughts, teams, investment portfolios or ecosystems, they all rely on *diversity* in order to survive and thrive.

For individuals, variety not only adds to the spice of life but also creates security and wellbeing – think diet and career skills. For organisations, a growing body of evidence suggests teams and companies with greater cognitive diversity perform better. The same logic applies at a planetary or ecosystem level.

We now have a greater understanding of the importance of female talent and leadership – something of particular importance given the current deficit of inspirational leaders and politicians. Through education, women also hold a critical key to mitigating and solving the climate change threat: education is negatively correlated with fertility rates. Improvements across emerging market countries therefore remain a top priority.

But the full diversity debate extends far beyond the narrow lens of gender to rightly incorporate race, ethnicity, socioeconomic background, LGBTQ+ rights and neurodiversity. Collective wisdom, if properly cultivated and acted upon, can be of immense value. However, that value hinges on having a genuine variety of inputs.

This could mean searching out the “misfits”, as Steve Jobs famously called them in Apple’s iconic 1984 advert. People with different experiences and backgrounds can add an additional perspective when generating ideas, as well as sharpening critical thinking when making decisions.

Climate change undoubtedly represents the mother of all ‘wicked’ problems – mere shorthand for an incredibly difficult challenge that criss-crosses domains and disciplines. If we are to make a dent in the task at hand, it is therefore imperative that we cultivate and nurture diversity, instead of tolerating or downright rejecting it. The challenges of actually achieving useful levels of diversity are manifold. Interacting with people who have different viewpoints can be uncomfortable.

Demis Hassabis, founder of DeepMind (now owned by Google) and someone who knows a thing or two about solving complex problems, is not daunted. Quite the opposite. In an interview with *Wired* magazine he said: “*Some of the most interesting areas of science are in the gaps between, the confluences between subjects. What I’ve tried to do in building DeepMind is to find ‘glue people,’ those who are world class in multiple domains, who possess the creativity to find analogies and points of contact between different subjects. Generally speaking, when that happens, the magic happens.*”

Ultimately, our survival, just like all species on Earth, depends on diversity. We should bear that in mind when going about our day-to-day lives.

**“If we are to achieve a richer culture, rich in contrasting values, we must recognize the whole gamut of human potentialities, and so weave a less arbitrary social fabric, one in which each diverse human gift will find a fitting place.”**

**— Margaret Mead, anthropologist**

# VOICE & EXIT

## THE DANGERS OF DIVESTING

Should I stay or should I go? Not known for their economic wisdom, the Clash’s 1982 hit actually strikes a chord with a key debate in finance and economics.

Nobel Prize-winning economist Albert Hirschman described people’s options in response to things they don’t like as binary: either use your “voice”, or “exit”. And while not likely to reach number one in the charts anytime soon, his argument forms an important part of the climate debate.

In the *What have the fossil fuel companies ever done for us?* chapter, we cautioned about writing an entire sector off so as to clear one’s conscience. Convenient and immediate as that would be, it carries one major disadvantage: you lose your voice. Without which you have no influence over the future direction of the company you have divested from. Once investors sell, they can no longer apply pressure on company boards and strategy.

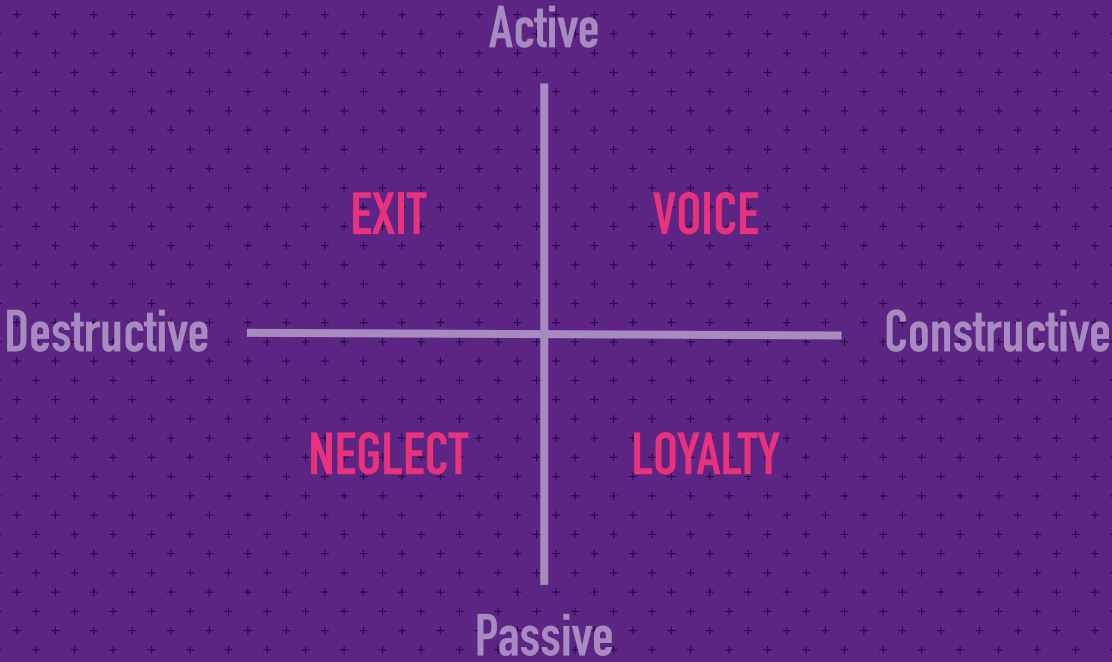
The significance of this centres on the premise of whether you believe, as we do, that many energy companies can be just that: *energy* companies. Making the required transition without them will be extremely hard.

There is also the slightly shakier argument that if you don’t own a share of the company then someone less scrupulous will. The company’s funding won’t therefore be impacted and you could not only lose out financially but also lose your ability to vote on key (climate-related) issues at its Annual General Meeting (AGM).

This is not a strong moral argument, but it does reflect reality. Good investment managers will engage on these issues on your behalf and, as substantial institutional asset owners, their voice carries weight. It is therefore worth checking if their principles are aligned with yours, and voting yourself on key decisions at AGMs if you sense they might not be.

Deciding when you have had enough of vacant promises – and therefore when to sell out – is not a perfect science. The threat of divestment must always be there for any engagement strategy to work well, otherwise any threats are veiled (this is why pure passive index trackers struggle to engage effectively).

So should you stay, or should you go? The biggest question to ask is which one is more likely to bring about change: staying and making your voice heard, or bolting for the exit? As Hirschman astutely observed, while exiting might sooth the conscience, it also tends to entrench the status quo.



“Exit and voice, that is, market and nonmarket forces, that is, economic and political mechanisms, have been introduced as two principal actors of strictly equal rank and importance”

— Albert Hirschman, economist



# MORE FROM LESS

## HAVE WE REACHED PEAK STUFF?

Here's a positive story, and one you've likely not heard: the amount of 'stuff' we use in the developed world is actually going down.

Andrew McAfee, best-selling author and MIT professor, argues this point persuasively in his recent book (from which this chapter takes its heading). He asserts that, contrary to popular belief, evidence is emerging to show the amount of raw materials used in developed countries is actually levelling off.

McAfee argues that this dematerialising has been possible because resources cost money and profit-seeking competitors will always try to avoid spending money where they can.

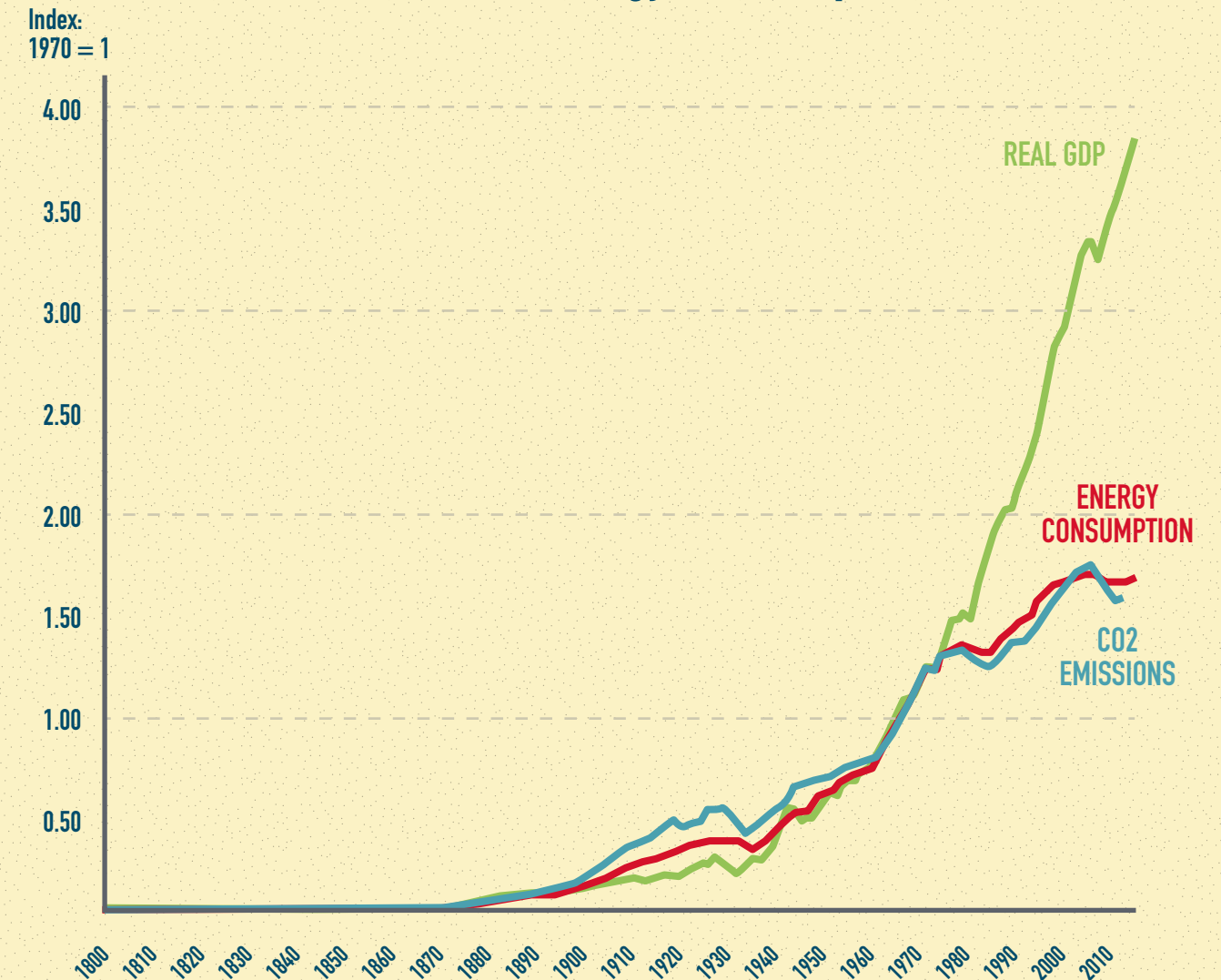
The rise of the intangible economy shows this clearly. Devices and products are either being slimmed down, swapped for something else, optimised, or evaporated. Think of the numerous physical contraptions made obsolescent by smartphones, or indeed the weight-shrinkage in aluminium drink cans over the last few decades. Depending on your level of soft drink addiction, you may not have noticed the latter, but it has happened.

In a particularly encouraging passage McAfee says: *"We do want more all the time, but not more resources. Alfred Marshall was right, but William Jevons was wrong. Our wants and desires keep growing, evidently without end, and therefore so do our economies. But our use of the Earth's resources does not."* For him, capitalism, technological progress, responsive government and public awareness are the driving forces behind this 'peak stuff' trend, a notion first coined by Fred Pearce back in 2010.

Economic growth continues to march forward over the long run. However, many key metrics, including energy consumption, metal usage, agricultural inputs such as crop tonnage and fertilizer, as well as building and wood products, support this idea that we are using less materials. They are either falling or not keeping pace with economic growth in the US, and McAfee believes these trends extend to other developed countries too.

None of this should be taken as a great climate get-out clause; there remains a long way to go both in terms of overall progress and the conversation. It does represent a hopeful start, though.

## US Real GDP and total energy consumption, 1800–2017



Source: OurWorldinData, 2018

# LEADING LIGHTS

## INSPIRING ACTION, AND CHANGE

For any of this to be possible we need leaders capable of inspiring action and instigating change. We need a mixture of those with the personality, charm and compassion to reach across divided debates and national boundaries and those who lead by example.

The election of Joe Biden is profound. In the wave of a pen on day one in office, the US President unlocked a swathe of momentum. The stored-up public sentiment and collective goodwill can (and will) cascade through various US and global decision-making authorities. The global ecosystem of multilateral and governing bodies suddenly feels energised again. Systems can only change when those at the top either champion a cause or step out of the way. Thankfully, in the case of Joe Biden the former has happened.

Unfortunately, though, truly creative and brilliant leaders are rare. Moreover, they often come from unlikely places.

Greta Thunberg and David Attenborough are cases in point. Arguably the two most prominent global climate activists on the planet, their voices (albeit supported by others) are forcing the public and politicians to sit up and take note; to finally take seriously an issue we have known about for decades. Frustrated by a lack of action, they understand the interconnections that underpin our natural world as well as the impact our lives have on the very ecosystems we so dearly rely on. Populist leaders therefore need not be of the negative variety. Strong, inspiring messages from truthsayers can win out.

There is another kind of leader required in the climate fight; a modest, less visible one. We call them the Monnet-leader. These are ego-less characters committed to a larger cause.


Arguably the main architect of the European project, Jean Monnet sat on the sidelines, charming and cajoling European leaders to his way of thinking. He was willing to furnish the egos and careers of others in favour of a greater outcome.

*“My strength was the naïveté of a young man. ... I arrived on the scene at a time when men in power were at a loss, when they did not know which way to turn,”* reflected Monnet. He was also forever trying to unite people: *“My sole preoccupation was to unite men, to solve problems that divide them, and to persuade them to see their common interest. ... I have always been drawn towards union, towards collective action.”*

A slightly more conventional leader, but no less inspiring and courageous, is ex-Bank of England Governor Mark Carney. Acting as a pioneer, he recognised the *tragedy* lying ahead on the *horizon* and sought to incorporate it into the central bank’s operating framework. This was, and still is, nothing short of revolutionary. Other central bankers have yet to take such bold and decisive action in the face of climate change.

We have already established that climate change is a collective action problem. And, while an environmental issue, it is also a political, economic, financial, and national security challenge, infringing on human rights and interacting with almost all the sustainable development goals (SDGs).

In the face of this complexity, Attenborough, Thunberg, Monnet and Carney stand out as beacons of hope for every type of leader in every type of organisation. They also remind us that leadership does not always come from the ‘top’. It can come from anywhere; from us, or you.



“If the world is to be healed through human efforts, I am convinced it will be by ordinary people, people whose love for this life is even greater than their fear.”

— Joanna Macy, environmental activist & author

# LOONSHOTS, MOONSHOTS AND EARTHSHOTS

Creativity and innovation are inherently messy. Experts tend to agree on a couple of common threads though.

First, *people* have ideas and drive innovation. Second, these same people need the right culture and environment in order to thrive. Safi Bahcall, technologist and business executive, argues in his best-selling book *Loonshots* that we should embrace this messiness and nurture crazy ideas. It is these – not the obvious, logical and mundane – that will transform lives and industries.

Not every idea will work. Yet when planning and investing, this can be mightily hard to embrace. By definition, waste must be built into the search for ideas and solutions. Unfortunately, managers and investors absolutely hate waste.

Further compounding the innovation challenge is the misconception that innovation only happens in the private sector and governments simply get in the way. This is a myth. Most of the core technology that powers the smartphones in our pockets was created by government-financed research. The same is already proving true of other next-wave technologies.

This short-sightedness affects our ability to create effective systems and frameworks for innovation funding. Economist Mariana Mazzucato uses the example of \$500 million government loans to Solyndra and Tesla to make this point. The former went bust and the US government received a high-profile kicking. The latter has (so far) worked out and the government merely gets its money back plus some interest.

Governments should learn from this hindsight. Venture capitalists make sure that equity provision is included in the deals they strike – thereby capturing adequate upside when things work out and offsetting the ones that don't. Governments and national investment banks could do the same, as well as search for more productive partnerships with private industry.

Mazzucato is also among the many experts and economists calling for grand, ambitious 'moonshots' to be drawn up. Taking policy inspiration from the 1960s effort to reach the moon will be absolutely necessary if we are to achieve our goal of decarbonising and reaching net zero by 2050 (or hopefully before). Memories of the Marshall Plan have also been evoked.

The Earthshot Prize announced by The Royal Foundation represents a blend of these ideas. It aims to provide at least 50 solutions to the world's greatest environmental problems by 2030.

Taking risks and spending large sums of money requires courage. Inspiring political leaders, capable of rousing social and political capital, will be necessary to make these dreams a reality; as will actually listening to them.

**“No one knows for sure what will work, so it is important to build a system that can evolve and adapt rapidly.”**

**– Elinor Ostrom, political economist**

# AVOIDING THE GROWTH TREADMILL

At some point or another, most of us have felt like the proverbial hamster, stuck on the wheel diligently placing one foot in front of the other without quite knowing what for. This obsession with making progress, even if only of the perceived variety, is key to understanding human nature.

It also helps explain economists' obsession with economic growth. Although as the *More from less* chapter highlighted, our yearning for progress does not have to come at the expense of the planet's resources, assuming such an optimistic future path would be foolhardy. How best to measure and monitor economic and social progress is therefore a big question.

Gross domestic product (GDP) is a flawed human invention because it doesn't capture all the productive activity we humans undertake. Created in the 1930s by US statistician and economist Simon Kuznets, it was used as a proxy for national output so as to help plan and finance war efforts.

Since then, with a few tweaks here and there, it has stuck as the principal means of measuring economic progress. The accounting flaws lead to quirks like official economic growth going down if you marry your housekeeper.

Measures of inequality, well-being and happiness, suicide rates, knowledge and skills, health, civic engagement, cultural identity, time use, social connections and environmental considerations are notably absent from GDP calculations – as are the black and informal economies. Indeed, Kuznets himself warned of his measure's limitations, pointing out *“economic welfare cannot be adequately measured unless the personal distribution of income is known”*. Unfortunately, his warnings have been ignored.

Should GDP be scrapped then? Far from it. As a measure of output, it remains the best of a bad bunch. What is more, the upheaval involved with weaning our entire economic system off it would not be worth the hassle. Also, many of the factors not captured are notoriously woolly and hard to measure.

Economists Mark Carney and Mariana Mazzucato sum up the debate neatly by urging us all to redefine what we mean by value. True value, they argue, extends far beyond what any single price or number can capture.

One suggestion is to incorporate complementary measures, like Genuine Progress Indicator and GDP-b, that capture many of the missing metrics into a useful dashboard for policymakers. Other examples of progressive measurement include the UNDP Human Development Index and the Bhutan Happiness Index.

In theory, our deep-rooted desire to strive for more should start to subside once we reach a minimum threshold of subsistence. In practice, though, no matter how 'light' we make the growth treadmill we will all still keep getting on it. It therefore makes sense to try and measure the impact more accurately. Unfortunately, as things stand, Oscar Wilde's cynic might very well judge us as fools.

**“A fool knows the  
price of everything  
but the value  
of nothing”**

**– Oscar Wilde, poet & playwright**



# THE SHADOW OF THE FUTURE

## PROMOTING ALTRUISM AND GLOBAL COOPERATION

We stand at a critical juncture. At the exact moment we need global collaboration and cooperation the most, the institutions that support it are at their most fragile. The Bretton Woods meeting in 1944 set the foundations for a new global architecture: the United Nations, World Bank, International Monetary Fund and World Trade Organisation all trace their origins to that famous gathering. Currently though, they all look rather beleaguered.

With so much resting on global cooperation, a quick refresh of game theory basics would not go amiss. Political scientist Robert Axelrod's work showed that so long as 'the shadow of the future' looms large enough, even self-interested people will cooperate. Accordingly, 'Tit-for-tat' strategies emerged as the most successful in iterated versions of the prisoner's dilemma game in the 1980s. After initially cooperating, players using this strategy replicate an opponent's previous action; so you act nice until you get stung. And to paraphrase Richard Dawkins, author of *The Selfish Gene*, "*nice guys can actually finish first*".

So, if the prospect of a repeat encounter is significant the incentive not to screw over other players can be large enough to promote cooperation. Climate change, you would think, should provide such a 'shadow'. In terms of global cooperation on climate change, the Intergovernmental Panel on Climate Change (IPCC) stands out as a beacon of hope.

But bold new global coalitions will also be required. On the grand and broad political stage, our international financial and diplomatic architecture will need to evolve and adapt.

We will need enhanced international cooperation between public and private financial institutions. In terms of finance, an International Platform on Climate Finance (IPCF) should be set up to sit alongside and complement the IPCC. The Global Covenant of Mayors for Climate & Energy is another example of creative alliances being formed to share knowledge, experience and resources.

Creating productive and useful forums and coalitions for change will continue to form an important part of the fight against the rising climate tides and challenges. If the ambitions of the historic Paris Agreement are to be met, we must use the current window to create the institutions, frameworks and accountability required to make the seismic shift. Mohammed Saldi, economic adviser to Indonesia's General Suharto, said "*Good times make for bad policy*". Well the opposite is also true, and we should seize the opportunity with both hands.

Ultimately, every organ of society, from individuals, companies, governments and the third sector, need to pull *together* if we are to successfully overcome the threats posed by climate change. The concept of the 'climate shadow' should foster a greater sense of community and collectivism. After all, understanding that we are part of something bigger and recognising that climate change has the potential to threaten our very existence should be motivation enough.

"A Chinese novel," I said.  
"That must be rather curious."

"Not as curious as one might be  
tempted to think," replied Goethe.  
"These people think and feel  
much as we do, and one soon  
realises one is like them."

– Goethe's conversations with Eckermann, 1827

# MARSHALLING MULTILATERALISM

Achieving meaningful and lasting institutional change is no mean feat.

Existing economic and political models have proven unequal to the challenge: neither a ‘command and control’-style system where government attempts to fully direct finance flows, nor systems where market participants are given free rein to allocate capital, have managed to set our planet on a sustainable footing or deliver the scale of finance needed.

A new plan, on an even greater scale, is needed to address the daunting challenges of climate change and sustainability. With insufficient investment flowing in the right direction, governments, the private sector and NGOs need to come together to innovate solutions to these challenges. This could involve technological, process, governance or system innovation.

In 1948, much of Europe lay in ruins following the Second World War. US Secretary of State George Marshall led an investment plan to help Europe recover. His Marshall Plan ultimately contributed over \$13bn (over \$140bn in today’s money).

Today’s challenge can seem even more daunting – requiring global investment on the scale of at least 50 Marshall Plans every year until 2030. But there have also been positive developments since the time of the original Marshall Plan that we can and must utilise.

Firstly, for all its current problems, the multilateral global system is far more developed than it was in 1948. There are now numerous fora where the world’s countries can and do come together to discuss problems and work through solutions. Indeed, the Paris and Sustainable Development Goal (SDG) agreements represent crowning achievements.

Secondly, the pool of global capital potentially available to meet these challenges is far greater than it was at the time of the Marshall Plan. While estimates vary, most place the available global capital at upwards of \$170 trillion. This is more than enough to bridge the financing gap to the SDGs.

A Marshall Plan for the planet, then, would leverage the multilateral system to shift market incentives towards a far more sustainable funding model, thereby delivering enough investment to meet global sustainability needs. It would also take advantage of the way in which these institutions can create global norms and standards, disseminate best practice and build capacity.

The original Marshall Plan was the vision of one man, enacted by one country. This time it must be equally as ambitious but also broader and deeper: a network of interlocking, supplementary initiatives at international, regional, national and local levels.

A ‘New Marshall Plan’ should:

- Establish and strengthen international and national frameworks for sustainable finance
- Ensure a greater share of all public sector financial flows are sustainable
- Shift private sector financial flows by adjusting pricing and other incentives
- Improve market information to make the sustainability risks and rewards of financial assets clearer
- Educate people about the connection between their personal finances and sustainability

Global investment  
on the scale of at least

50

Marshall Plans  
every year until 2030

Signed \_\_\_\_\_ Date \_\_\_\_\_

# FIXING FINANCE

## DISCOUNTING DEFICIENCIES AND HARNESSING PRIVATE CAPITAL

In the long run we are dead. So said legendary economist John Maynard Keynes.

To bend his famous phrase a little, many current financial market valuation methods are far too short-termist. Unfortunately, very few policymakers, politicians or civil society representatives understand how the many different financial services institutions work together. And in the absence of appropriate oversight, society and the real economy serve financial interests, rather than the other way around.

The short-termism inherent within market valuation techniques does not help matters. Discounted Cash Flow (DCF) valuation techniques effectively underpin almost all global investment analysis. However, social and natural capital are ignored as these are external to the corporate profit and loss statement. Future generations are also ignored.

Instead, all investments are assumed to be able to grow infinitely, despite the very real risk that an asset's terminal value could end being zero. We are left with millions of professional investors managing trillions of assets on our behalf, all of whom fail to accept the one planet boundary condition.

This is why fiscal measures such as carbon taxes, market mechanisms like emissions trading schemes, benchmarks (like the World Benchmarking Alliance) and standards as well as regulations, are vital to sustainable development. Apps and dashboards will also improve transparency and nudge better behaviours and habits.

These initiatives can all help ensure that the market price reflects the full social and environmental costs, which drives corporate valuation. A company's value helps it to compete – i.e. a higher market price means a lower cost of capital, which

is a competitive advantage. And sustainable companies should be able to raise capital more cheaply than unsustainable ones.

Given how important this is, and that all young people aspire to become savers and investors, why isn't sustainable finance and financial citizenship part of the national curriculum?

We are left criticising corporate sustainability platitudes without realising that a fundamental part of the problem lies with all of us: how do we vote, spend, save and invest as individuals? How many of us with pensions have bothered to check whether shareholder votes cast on our behalf at the annual general meetings of the companies we own reflect values we agree with? Inspired by this, the organisation Make My Money Matter aims to completely shift the power dynamics in our current financial system.

We often wonder when change will come. It will likely be when big business realises that its long-term survival is threatened by unsustainable business practices. It will be when individuals realise that civilisation itself is under threat – because if civilisation collapses, money will cease to work either as a medium of exchange or a store of value.

In other words, it will be when we all realise that discounting future generations doesn't work and money is currently destroying money. The market will only help to safeguard our future and promote genuinely sustainable corporate activity when prices and valuations reflect the true costs to society and the environment.

Ultimately, *markets* do not have a conscience, *people* do. And if we are not careful, what Keynes so wryly implied for each of our own long-run fates will also be true for the whole of society.

## GREENING YOUR PENSION IS

# 21x

**MORE POWERFUL AT CUTTING  
YOUR CARBON FOOTPRINT  
THAN STOPPING FLYING,  
BECOMING A VEGETARIAN AND  
MOVING TO A RENEWABLE  
ENERGY PROVIDER COMBINED.**



BASED ON AN AVERAGE PENSION OF £30,000, SOURCE: MAKE MY MONEY MATTER



# CAPITALISM'S BURNING QUESTION

Is it up to the job? The last few chapters have been hinting at an inescapable truth: capitalism, in its current form, is seriously flawed.

When asked who owned the polio vaccine he had discovered in the 1950s, Jonas Salk famously said: *“Well, the people, I would say. There is no patent. Could you patent the sun?”*

Firstly, it is hard not to be awestruck by Salk’s generosity. And while his comments might seem a bit left field for our discussion, in just fifteen words he manages to cut straight into the chasm between capitalism and socialism.

Salk effectively tells us that there are no simple answers about how we should motivate individuals and organise societies – human nature is absurdly complex and so it is no wonder that our organising structures and mechanisms are, too. Regardless of your political leaning, numerous market failures prove that, left to its own devices, the free-market system will leave us with not just sub-optimal outcomes, but potentially fatal ones.

Does that mean we should abandon capitalism altogether? Absolutely not. It needs fundamental and radical change, but guided in the right direction, it can do all the things we need it to.


The black-and-white way we tend to look at the question is also misleading: a false tension. Nobody seriously believes zero government or zero market is the answer. The optimum lies somewhere in-between. Nor are industries created equal, and there is no one-size-fits-all template we can follow; what works in pharmaceuticals and healthcare will not necessarily work in rail and transport.

Correcting market failures, identifying and developing strategic industries, aligning incentives, supporting a just energy transition, ensuring social justice: these are the responsibility of government. As an example of what not to do, in the face of rising antimicrobial resistance and increased prevalence of MSRA superbugs, Lord O’Neill’s Review on Antimicrobial Resistance found that not one new antibiotic drug has been created since the 1980s.

Yet if climate change amounts to the world’s biggest market failure, what hope can we have of creating the right balance of public and private involvement? If we are not careful, won’t one crowd out the other?

Addressing a group of creative art students at the Glasgow School of Art in 2018, Andy Haldane, former chief economist at the Bank of England, said: *“The lesson of history is clear. For societies to grow sustainably, we need the imagination inside our heads to generate creativity, ideas, innovation. But we also need social institutions that connect and curate these heads to generate collective intelligence and collective action.”*

The balancing act of steering capitalism in the right direction, while not stifling its innovative magic, is delicate. Finding ways of reframing the polarised debate between public and private interests, focusing on outcomes and not pre-meditated ideals, will be critical to unleashing capitalism’s immense force and directing it to the areas it can have the most impact. This will require intervention where necessary to help nudge things in the right direction. It also implies, as Mark Carney and Mariana Mazzucato remind us, that we should continually question exactly what ‘value’ means.



**“Our species may have backed itself into the mother of all evolutionary corners, but sometimes such moments are when our best work is done.”**

**– John Elkington, sustainability pioneer**

06

SOME  
CHARTS  
OF HOPE



**“All opinions are not equal. Some are a very great deal more robust, sophisticated and well supported in logic and argument than others.”**

— Douglas Adams, *The Hitchhiker's Guide to the Galaxy*



**64% of people said that climate change was an emergency.**

**Peoples' Climate Vote, UNDP and University of Oxford, January 2021**

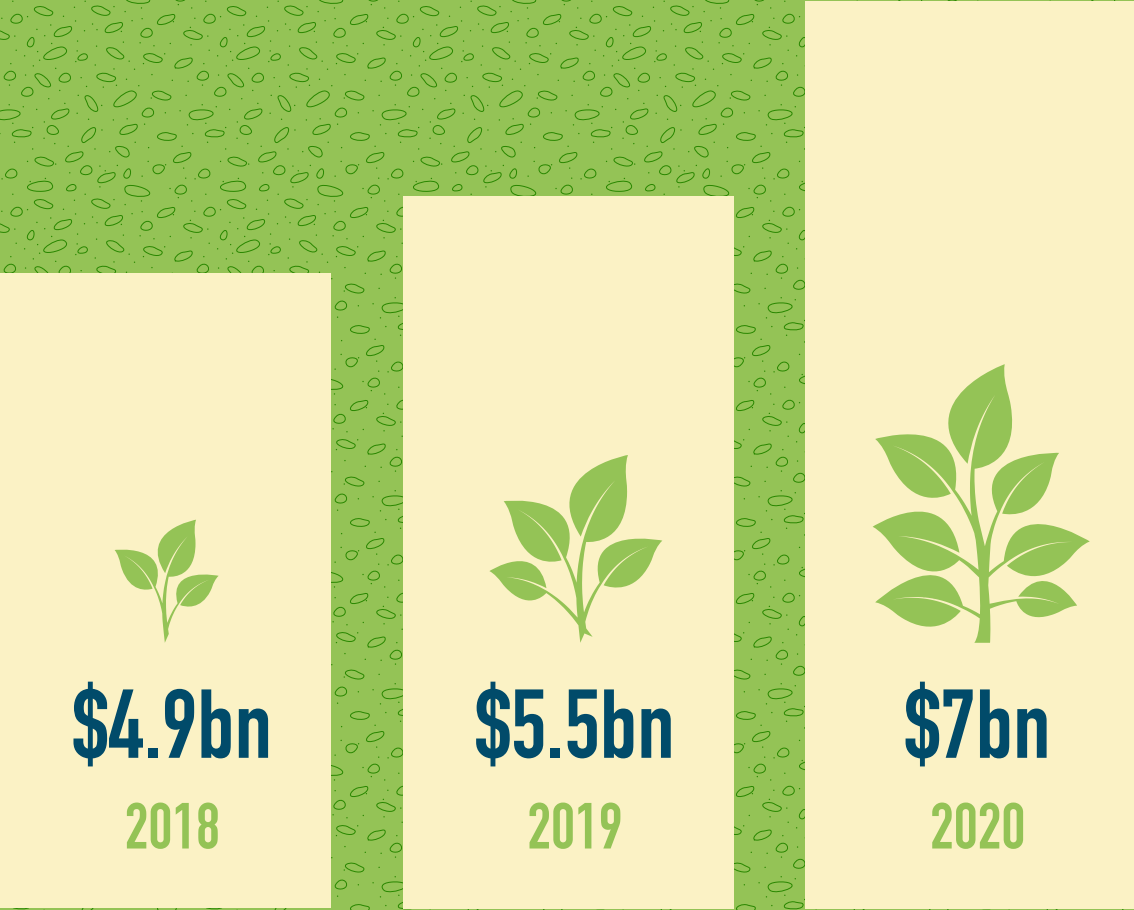
With 1.2 million respondents, the Peoples' Climate Vote is the largest survey of public opinion on climate change ever conducted. Using a new and unconventional approach to polling, results span 50 countries covering 56 per cent of the world's population. Poll questions were distributed through advertisements in mobile game apps in 17 languages, which resulted in a huge, unique, and random sample of people of all genders, ages and educational backgrounds.

Internet users in the USA, the UK, and China who are willing to contribute\* financially to solve climate change



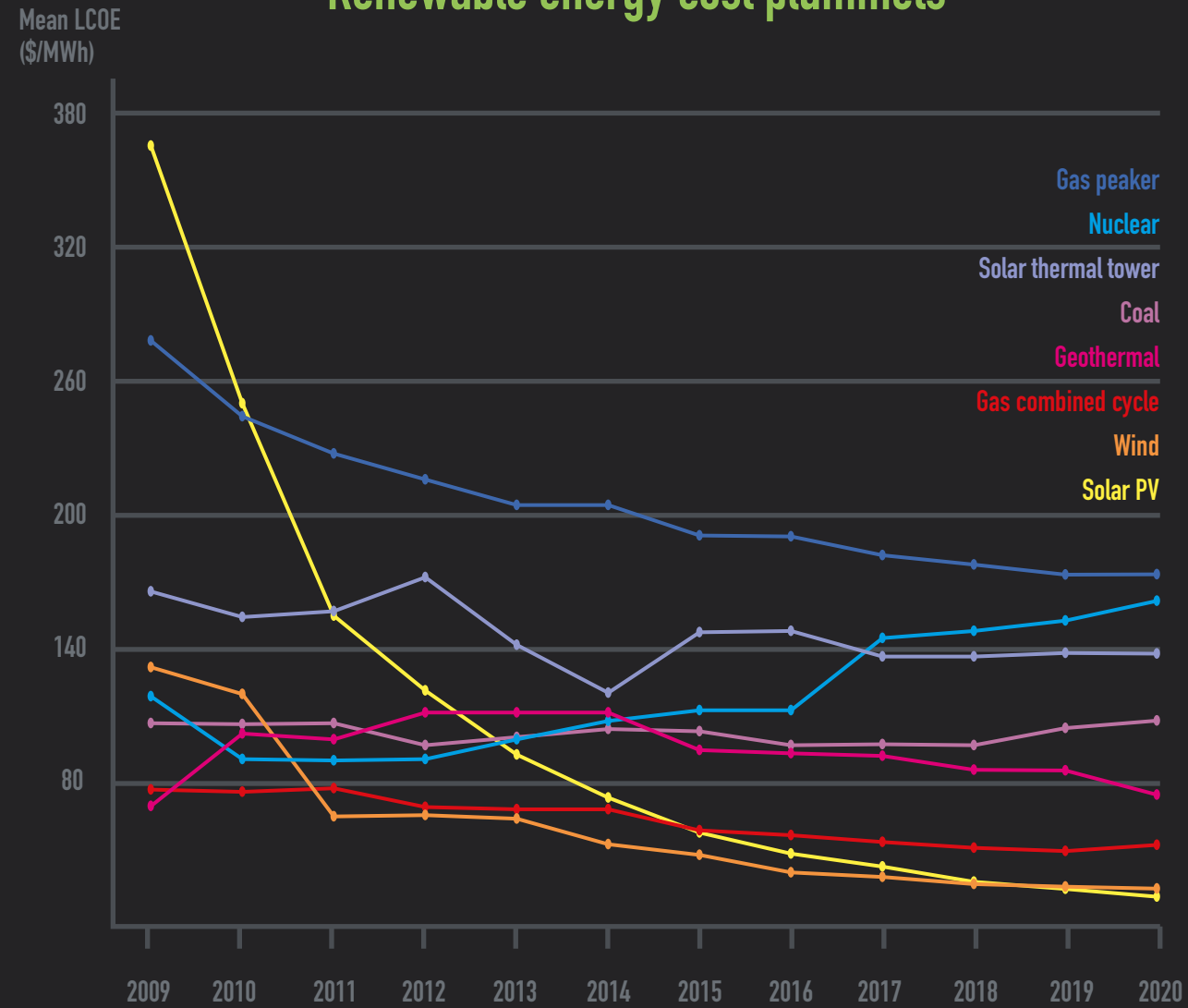
\*Note: ages 18+; at least 0.5% of annual salary.  
Source: Wuderman Thompson. 'Regeneration Rising: Sustainability Futures'. June 8, 2021

Total plant-based foods  
Three-year sales



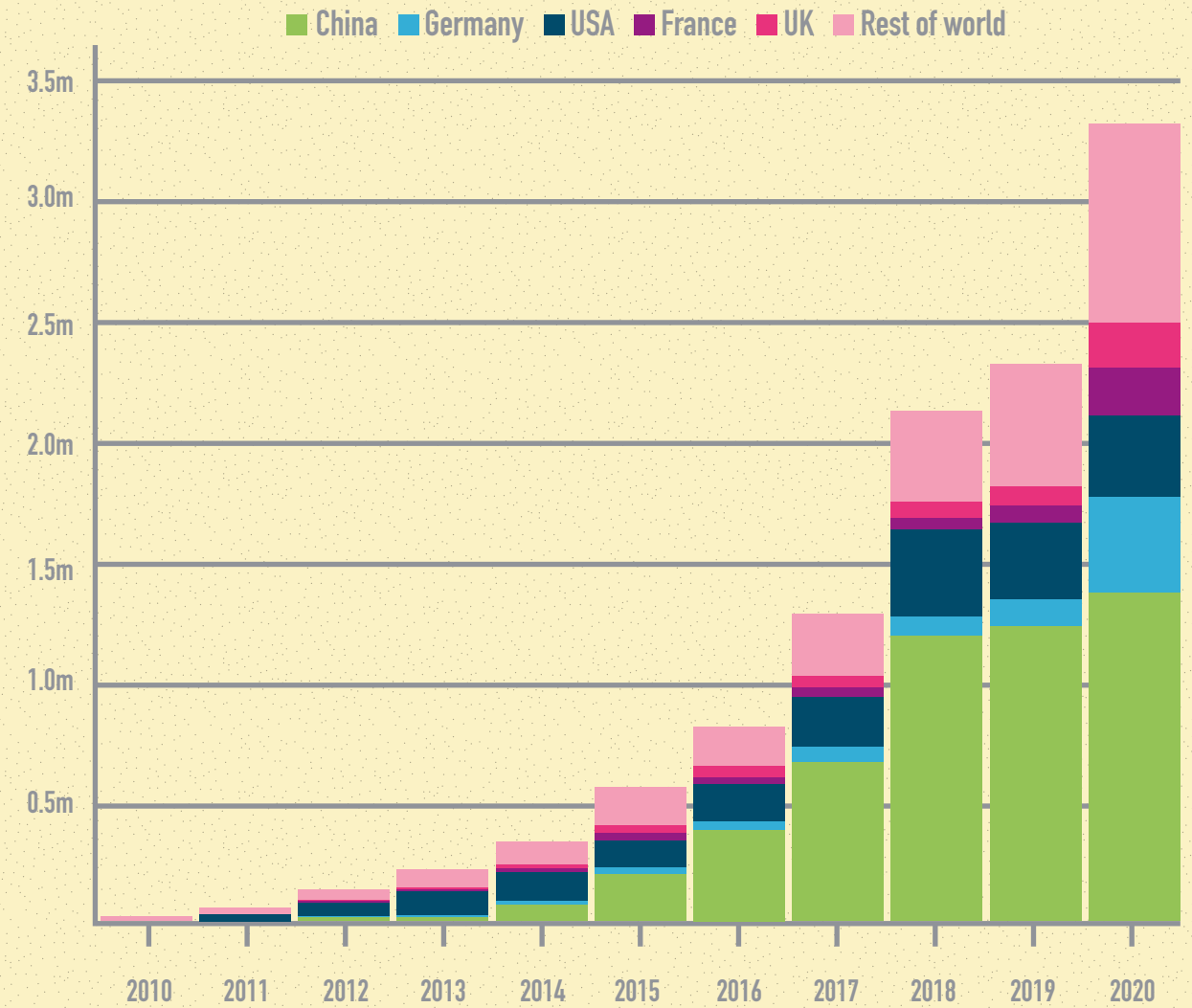
Source: Plant Based Foods, retail sales data (52-week calendar year) ending December 27, 2020

## Renewable energy cost plummets



Source: Levelized Cost of Energy ("LCOE") - Version 14, Lazard, October 2020

## Global plug-in vehicle market



Source: EV Volumes, 2021

07

## CONCLUSION



**“Only a child sees things with perfect clarity,  
because it hasn’t developed all those filters which prevent us  
from seeing things that we don’t expect to see.”**

— Douglas Adams, *The Hitchhiker’s Guide to the Galaxy*

# THE SERENGETI RULES



The Serengeti is a fitting place to end on for a number of reasons.

First, the remains of our distant ancestors, three different hominid species that lived 1.5 to 1.8 million years ago, were found just three miles from Tanzania’s Rift Valley. Remains from even further back (3.6 million years ago) were also reportedly found just 30 miles south of the Serengeti. Second, it is emblematic of our more primitive biological make up: many of our cognitive biases, in particular our aversion to loss, stem from the nasty, brutish conditions our ancestors endured on the African plains. Third, and a cheeky example of recency bias, it was a memorable and life-altering holiday destination for one of us.

But the real reason is more far-reaching and important. The Serengeti Rules are a set of ecological principles coined by biologist Sean B. Carroll in his book of the same name. They represent a key to understanding the ‘logic of life’, as well as a key to helping remove the suffocating cloak of carbon draped in our atmosphere.

## KEYSTONE SPECIES: SOME MORE EQUAL THAN OTHERS

In Carroll’s mind, everything is regulated in some way or another. Be it the molecules and cells that make up our bodies, or the intricate and interconnected web of relationships that maintain balance within an ecosystem, stability and harmony is achieved through regulation and feedback, both positive and negative.

Thinking in this way naturally broadens one’s horizon. It is a framework that puts life, in all its glory, at the heart. By figuring out the rules of the most primitive game of all we can marry and map the same principles across to other walks of life. This fresh, outsider’s perspective helps free us from stubborn dogmas that have built up over centuries of intellectual debate.

It is therefore not a coincidence that we have ventured away from economics to help frame the psychology of climate change. With the exception of a creative few, the profession remains wedded to old mindsets and rusting tools. And while providing a few of the answers (e.g. carbon tax, and behavioural insights), far too much of economics is faulty for it to provide a useful and clear path out of the tangled mess we have gotten ourselves into.

Instead, the logic of life revealed on the Serengeti acknowledges there should be certain limits to growth and that regulation is not only required but essential to keep everything in check.

Certain keystone species form part of this regulatory function, helping to balance the broader ecosystem around them. Take starfish out of rockpools in Mukkaw Bay in Washington State, and mussels take over. Remove sea otters from Shemya Island near Alaska, and sea urchins run amok at the expense of kelp.

In all cases, the resilience of the overall ecosystem is harmed as a result of human tinkering. On the great plains of the Serengeti, ecologist Tony Sinclair found that the voluminous wildebeest herds held the key to finding harmony across the great plain’s ecosystem. Intuiting the magic and the meaning of the place, Carroll knew he had found his non-predatory, carnivorous framing muse.





Not surprisingly, David Attenborough worked most of this out ages ago. He understands the inherent tension between Mother Nature and our own. In the concluding frames of his Netflix documentary, *A Life On Our Planet*, he says, “If we can change the way we live on Earth, an alternative future comes into view. In this future, we discover ways to benefit from our land that help rather than hinder wilderness; ways to fish our seas that enable them to come quickly back to life; and ways to harvest our forests sustainably. We will finally learn how to work with nature, rather than against it.”

After a lifetime’s exploration of the living world, he explains that he has become certain of one thing: “This is not about saving our planet; it is about saving ourselves. The truth is, with or without us, the natural world will rebuild. ... We have come this far because we are the smartest creatures who have ever lived. But to continue, we require more than intelligence; we require wisdom.”

That we are a form of mega keystone species should go without saying. The weight of responsibility that flows from realising this should also be clear as how we behave has huge ramifications for flora and fauna and the diversity of species on our planet. Instead of merely regurgitating Carroll’s Serengeti Rules here, we have created two bespoke climate checklists to aid your thinking and approach. By no means exhaustive, they should be of some guiding use.

## RE-FRAMING REGULATION

In a way then, this whole book has been about regulation – largely of ourselves, but also of the permitted kind ordained on us by others. Issues of paternalism will exercise some: who is in control, and should we be dictated to or manipulated by higher powers? Everyone’s tolerance level will be different, but the climate stakes are too high to worry about offending a few people.

There is an interesting chapter in Rory Sutherland’s book *Alchemy* that poses the question as to whether people need to consciously be aware of doing the right thing. Undoubtedly this is dangerous territory, but given the scale of challenge we face it seems wise not to get hung up on liberal moral semantics. The issue of free-will and paternalism should be viewed through the lens of the organ donor question: better to create a positive default choice and allow people to exercise their free-will by opting out. Nudging and free-will need not be contradictions in terms. Liberal principles and ideals can still apply.

There is also a definitional grey area to clear up. Many advocates of an unbridled free market have lost sight of regulation’s broader meaning, the meaning it had before it was co-opted for political purposes. They seem to focus on the restrictive part of its definition and forget the role it can also play in creating balance.

In contrast, *The Serengeti Rules* remind us that regulation of all kinds is an essential part of life. Our bodies do it instinctively to balance interactions between cells and molecules. Ecosystems do it through the use of keystone species, and some simple governing rules that help to balance the complex web of predator/prey relationships with nature itself. Our planet has been performing acts of regulation, maintaining itself in a form of harmony and balance, for billions of years. Until we came along.

By recasting the word regulation into its wider, less tainted, definition, we can start to see through the climate fog and toward a more hopeful plain. One that crisply reveals our true role. Though this path could end up involving only minimal sacrifice, it does require us to ‘check’ ourselves in this moment of crisis. Reminding ourselves of what is truly important is necessary to identify and correct the market failures that are tripping us up. The planetary boundaries we face are real.

Economist Kate Raworth uses a ring doughnut to visualise the minimum societal foundations required for healthy, functioning societies (inside the ring), as well as an outer ring covering our environmental limits. Her ring doughnut, based on decades of research by Johan Rockström and the Stockholm Resilience Centre, outlines the moral and ecological tramlines we must stay within. It also highlights the forces pulling us outside our prescribed limits.

In a similar spirit, Carroll invokes the twin metaphor of accelerators and brakes to describe how maintaining our 37 trillion cells is done through regulation. The problem being that when accelerators get stuck or brakes become broken, we can careen out of control. In a biological sense, this means cancer and disease. On a planetary level, the situation is not altogether different.

Re-casting regulation does not equate to reams of impenetrable rules and guidance. Instead, we advocate simple, but effective interventions that individuals, companies and governments alike can take, supported by well thought-through incentive mechanisms.

What is more, much of the regulation we are talking of can take place entirely in our minds and should also dissipate over time. For example, the alternative meat industry is pursuing the goal of indistinguishable taste – making any trade-off minimal. In some cases, it has already achieved this feat.

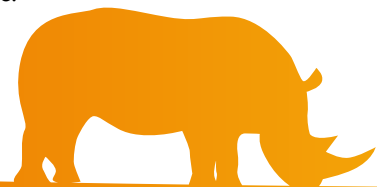
## NUDGE NUDGE, THINK THINK.

Persuasion and incentives form a crucial part of the required ‘checking’ mechanism. Through communication and rhetoric, we can literally conjure solutions and change behaviours out of thin air – like the Cornish sardine. When complemented by smart nudges, positive behavioural change can be directed at the climate problem to great effect.

Above all though, we must try to be understanding of the inevitable carbon consumption tax that is coming our way. As time slips away it remains the only viable way to cut our greenhouse gas emissions fast and deep enough. Though at some point society will progress to a level where the carbon tax stabilisers can be removed, this is likely to be quite a way off.

Through carefully directed finance, and a heavy dose of passion and leadership, we can foster the innovation and creativity so desperately needed to meet our climate goals.

Simply understanding how confused our perception of risk is, and how many of the challenges created are the result of our flawed psychology, has great power to effect change as well. The risks of not responding swiftly and severely enough do not bear thinking about. We should not think about this threat in terms of being right or wrong, but instead see it as an avoidance of the most asymmetrical gamble in history. This skew alone should focus our minds on the things that matter, carefully remembering, as famed economist John Maynard Keynes did, that it is better to be roughly right than precisely wrong.



Instead of focusing on the negatives, we should reorient our mindsets on how much we have to be hopeful about in the new world we are shooting for. Green energy, clean air, social justice and healthier, more sustainable food choices to name a few. However, all the while we'll need to remember that the stubbornness of human nature will ensure we never arrive at some sort of utopia. Inequality and tribal mindsets will pervade whatever form of society we manage to carve out for ourselves. A minority of bystanders and free-riders will always chance their arm.

Empathy will therefore be vitally important. None of us are perfect and there are two sides to every story. Unintended consequences, laced with hypocrisy traps, lurk around every corner. Empathy should help us self-regulate. As will understanding that the brain circuitry once so helpful for us while foraging for food and shelter has not been optimised to help us tackle climate change.

## BEHAVIOURAL CASCADES, NOT WILDFIRES

Perhaps the greatest, but also simplest, insight we can all take away is the extent to which we are influenced by others. It is a logic that runs two ways.

First is self-regulation again. Acknowledging that our craving for a new car or house is not merely a personal desire, but one heavily influenced by our social circles, means we should be able to check such impulses. Secondly, if we are influenced by others then the opposite must also be true. This means others can and will benefit, either implicitly or explicitly, if we alter and modify our behaviour in ways that are more beneficial to the planet.

At some point, and on some level, converting implicit understanding into explicit drive for action will become vital. This is because conscious social will – i.e. that of the people – is a necessary precursor to political will. Ultimately, if we want something badly enough, and we make that fact known, politicians will have to find ways to deliver it. Thankfully, the climate movement already has a forceful head of steam behind it.

A big challenge in writing this book has been to avoid becoming too preachy. It is a hazard that dogs all climate change communication. The balance between informing and desperately prodding for behavioural change is a delicate one. However, neutrality is rarely inspiring. Caring about the climate requires passion and hopefully our instincts have kept us from sermonising.

Our aim for this book is that it will trigger people to reflect, self-regulate some of their behaviour to make it more sustainable, and think about how they can make a difference – however big or small. Some of our ideas are challenging and non-intuitive; others are brutally simple and not new. We won't apologise for this.

It is a daunting prospect to pre-judge what people will take from this book. We are comforted by the sentiment of Margaret Mead: *"Never doubt that a small group of thoughtful, committed, citizens can change the world. Indeed, it is the only thing that ever has."*

Part of the beauty of life is that it is so unpredictable. We cannot predict how people will interpret or respond to our attempt at making sense of the intersect between our own psychology and the climate crisis. The nature of complex systems, with all their feedback loops and non-linearity, is that small actions can end up having a significant impact. If we can provoke thought or stir action from just a few, creating this book will have been a worthwhile endeavour.

The cruel paradox at the heart of the climate dilemma is that it is entirely of our own making. One would therefore hope it is also well within our cognitive powers to adapt, mitigate and unwind the mess.

Our sense is that if people engage with their own psychology more honestly, becoming aware of their own failings and limitations, individual behaviour should become more environmentally thoughtful as well as better aligned to our inherent belief systems. Global collaboration efforts should become more successful too. The resulting behavioural cascades could surprise us all, acting as positive dominos that gather both force and momentum as they ripple through our networked and interconnected society.

Douglas Adams has played section guide to the galaxy of firing neurons that spark and connect inside our heads. Sometimes the dots fail to join in a way that make sense. We should therefore be confident enough to try things, yet humble enough to know our place in the grand order of the universe.

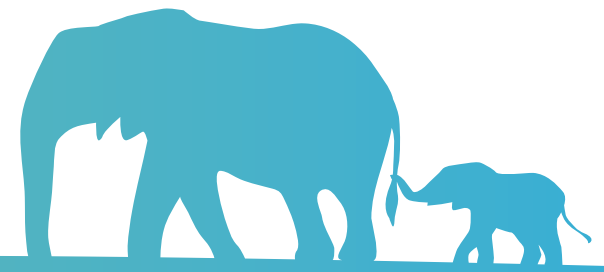
If any of our ideas seem slightly contradictory – and we will have missed many too – this is ok. Transitioning whole societies to new, healthier plateau will be bumpy and require trial and error. Any errors or omissions are our own and the future may judge some of our conclusions to be wrong-headed. Better to try and fail, than to not try at all.

## THE MYTH OF SISYPHUS

Carroll starts his final chapter with a quote from the philosopher Albert Camus: *"To save what can be saved, just to make the future possible: that is the great motivating force, and the reason for passion and sacrifice."*

In *The Myth of Sisyphus* Camus also said: *"The struggle itself towards the heights is enough to fill a man's heart. One must imagine Sisyphus happy."*

Carroll's choice of Camus is somewhat eerie as the symmetry with our, perhaps clichéd, use of Sisyphus on the front cover is unmistakable. Where we head from here is entirely up to us. The good news is our personal struggles can be happy and social ones. Maybe that is the key to getting nature back on our side.



## PRACTICAL CHECKLIST

“Use your voice, use your vote, use your choice” – Al Gore

- Make your voice heard by those in power (e.g. write to your MP)
- Talk about the climate crisis and the changes you make
- Eat less meat and dairy
- Cut back on flying (and offset where you can't)
- Walk and cycle more (and/or buy an electric vehicle)
  - But use your existing car to the end of its useful life first if you can
- Switch to renewable providers and reduce your energy use (and therefore bills!)
  - Insulate your home, turn down the thermostat, wash clothes on cooler settings
- Install rooftop solar panels (if you can)
- Respect and protect green spaces
- Invest your money responsibly (particularly your pension)
  - Join Make My Money Matter and ShareAction
- Cut consumption – and waste
- Become corporately active
  - Ask your employer what more they can do, and offer to help
- Consider the number of children you have



## PSYCHOLOGICAL CHECKLIST

- Embrace and understand your flaws
- Think global, act local
- Be imaginative and creative
- Be optimistic
- Create better default choices
- Use persuasion
- Harness the power of peer pressure
- Redefine or reframe the term ‘regulation’
- Recognise that solutions will not emerge by accident
- Recognise that global cooperation is possible and coalitions are powerful
- Social will is required to create political will
- Science can deliver solutions; expert management will be required to implement
- Check your ego, think of others and remember you are part of something bigger

## OTHER THINGS YOU CAN DO

- Complete the WWF environmental footprint tracker: <https://footprint.wwf.org.uk/#/>
- Sign the Make My Money Matter petition: <https://makemymoneymatter.co.uk/>
- CoGo realtime carbon tracker: <https://cogo.co/>
- Terracycle (for the harder to recycle items) <https://www.terracycle.com/en-GB/>
- Make a public climate pledge via Count Us In: <https://www.count-us-in.org/en-gb/project/>



## FURTHER READING

- *Value(s): The Must-Read Book On How To Fix Our Politics, Economics And Values* – Mark Carney
- *The Value Of Everything* – Mariana Mazzucato
- *The Entrepreneurial State* – Mariana Mazzucato
- *The Growth Delusion* – David Pilling
- *More From Less* – Andrew McAfee
- *Green Swans* – John Elkington
- *An Inconvenient Truth* – Al Gore
- *An Inconvenient Sequel: Truth To Power* – Al Gore
- *Under The Influence* – Robert Frank
- *Don't Even Think About It: Why Our Brains Are Wired To Ignore Climate Change* – George Marshall
- *Field Notes from a Catastrophe* – Elizabeth Kolbert
- *Doughnut Economics* – Kate Raworth
- *The Future We Choose* – Christiana Figueres
- *No One Is Too Small To Make A Difference* – Greta Thunburg
- *Human-Kind: A Hopeful History* – Rutger Bregman
- *The Ministry Of The Future* – Kim Stanley Robinson
- *This Changes Everything* – Naomi Klein
- *On Fire* – Naomi Klein
- *The Psychology Of Climate Change* – Geoffrey Beattie
- *Psychology And Climate Change: Human Perceptions, Impacts, And Responses* – Susan Clayton
- *What We Think About When We Try Not To Think About Global Warming* – Per Espen Stoknes
- *The Unhabitable Earth* – David Wallace-Wells
- *Losing Earth: The Decade We Could Have Stopped Climate Change* – Nathaniel Rich
- *There Is No Planet B* – Mike Berners-Lee
- *The Burning Question* – Mike Berners-Lee and Duncan Clark
- *Reimagining Capitalism* – Rebecca Henderson
- *The Future Earth* – Eric Holthaus

## USEFUL READING SOURCES

- NYT Climate desk: <https://www.nytimes.com/section/climate>
- Guardian Climate: <https://www.theguardian.com/environment/climate-change>
- NASA: <https://climate.nasa.gov/>
- We are still in: <https://www.wearestillin.com/>
- 350.org <https://350.org/>
- UN Sustainable Development Goals: <https://sustainabledevelopment.un.org/?menu=1300>
- Project Drawdown: <https://drawdown.org/>
- Together with Nature: <http://www.togetherwithnature.org/>



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*Thank you to the universe. All these ideas already existed, we just found enough fleeting lucidity to piece them all together.*

*Thank you also to Aviva and Aviva Investors for supporting this charitable endeavour, both financially and logistically. Without their design, printing and distribution support, the book would never have seen the light of day. Steve Kidd, in particular, deserves a special mention.*

*Finally, thank you to all those who proof-read the early iterations and provided feedback – it is a much better book because of it. You know who you are.*

## A FINAL PLEA

There is an extremely high likelihood that the copy of the book you have was free. That is how we wanted it. However, we would like you to act – assuming you enjoyed it, that is. Hopefully the practical and psychological checklists are of some use here. But a more direct way would be to make a public pledge or a donation. Count Us In is an organisation that offers the perfect way to do this:

<https://www.count-us-in.org/en-gb/project/>

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“So long, and thanks  
for all the carbon”



[www.againstournature.com](http://www.againstournature.com)

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